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SUMMARY OF RECENT ABSTRACTS*

I. CHOLERA

Epidemiology

ABDOU (p. 175) describes the origin and course of the recent epidemic of cholera in Egypt. In one month there were 8,308 cases and 3,230 deaths, and the disease was spread from its original focus by escaping settlers and by contaminated dates. In the *Lancet* (p. 175) it is stated that main water supplies do not seem to have played any part in spread, but that badly constructed shallow wells did so to some extent. Treatment of patients by replacement of water and salt was the most important therapeutic measure, sulphonamides were on the whole disappointing. The value of vaccination was confirmed. In another article in the same issue of the *Lancet* the point is made that existing quarantine measures have been based on an incubation period of 5 days, and an average period of 5 days for excretion of vibrios; the rapid advance of air travel seems to demand a significant alteration of these measures.

In the *Chronicle of the World Health Organization* (p. 333) there is an account of the Egyptian outbreak of cholera, which increased for 5 weeks, and thereafter declined. In 8 weeks there were 20,877 cases and 10,265 deaths. A noteworthy point is that the disease failed to establish itself in any town provided with a satisfactory water supply and an adequate sewage system, in spite of repeated introduction from the villages.

BIRAUD and KAUL (p. 426) of the World Health Organization discuss the epidemiology of cholera in relation to the Egyptian outbreak. The source of the epidemic is still obscure but there is a suggestion that a carrier of the vibrio may have travelled to Egypt from India by air. The focal point was overcrowded with people not normally resident there, and they stampeded and spread the disease widely. Large cities escaped the outbreak because water supplies and sanitation were satisfactory. Graphs of the outbreaks of 1902 and 1947 are very similar, yet in 1902 there was no vaccination, which was widely used in 1947. TAYLOR (p. 599) makes the point that there is no definite information on how cholera reached Egypt, but that it was presumably by air or sea.

WAHID (p. 998) found 16 positive results in 600 contacts examined in Egypt; 12 of them were carriers for only 2 days, and the longest period was 7 days. Only 3 contacts showed evidence of the disease.

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1948, v. 45. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

UNDERWOOD (p. 599) has written an account of the history of cholera in Great Britain.

Aetiology

SHRIVASTAVA and WHITE (p. 334) have examined various strains of vibrios. They quote their results, showing that, for instance, an Inaba strain can be produced by growing an Ogawa strain in the presence of Ogawa mono-specific antiserum. They hold that the existing classification of the vibrios is taxonomically invalid, and that it is probably merely expressing the range of natural variation of a single organism. The paper should be read in full. WHITE (p. 599) again expresses the opinion, formed as a result of his own recent work, that the known types of cholera vibrios are not separate species, but phases of a single species. He agrees with TAYLOR that in 311 strains inagglutinable with O group I serum, there was no evidence of cholerigenic activity (except possibly in one strain).

REIMANN (p. 74) thinks that in cholera epidemics either a single type strain or different serological types of the cholera vibrio are concerned. He discusses the possibilities.

The Korain strain of *V. cholerae* from Egypt was of Inaba type ; GOHAR and MAKKAWI (p. 705) point out that it does not live long inside dates, probably because acid is produced by fermentation of carbohydrates. The same authors (p. 706) examined the viability of the vibrio on various articles of food and clothing ; there was a high correlation between the time of collection of dates and the time of the outbreak. Experiments by GOHAR *et al.* (p. 897) in Egypt indicate that the cholera vibrio lives no longer than 24 hours in sea-water at 18°C., but that there may be an antibacterial substance in the sea-water which can be destroyed by autoclaving, but cannot be removed by Seitz filtration.

BLASS (p. 176), having studied the metabolism of glucose by non-proliferating vibrios, thinks that the ratio of CO_2 produced to glucose consumed is too variable to be useful in distinguishing *V. cholerae* from the El Tor vibrio. GALLUT (p. 177) has continued his researches on the utilization of glucose by *V. cholerae* under aerobic conditions. He sets out some characters of the vibrio, and shows that though it is normally a facultative anaerobe, it is adaptable to strict aerobiosis during the phase of growth. He (p. 600) discusses the mechanism of the cholera red reaction, especially as regards the part played by glucose ; the discussion should be read in full.

GALLUT and GRABAR (p. 427) have previously demonstrated that the cholera toxin shows two fractions, one comprising a large molecule, which is the O antigen ; the other having a small molecule. They now show that the latter has no antigenic power.

Recognizing that the usual tests are not useful for differentiation of the true cholera and the El Tor vibrios, TANAMAL (p. 706) has devised a serological test in which he uses the Damang O-antiserum (probably relating to Hikojima-type vibrios) with a solution of sodium carbonate as diluent. At certain strengths of the sodium carbonate, El Tor vibrios are agglutinated, but not *V. cholerae*. In another test without serum, but with sodium carbonate and mercuric chloride solutions, the cholera vibrios flocculate but the El Tor vibrios do not.

YEN (p. 75) describes a modification of his phenolphthalein-starch medium for the isolation of *V. cholerae*. The new modification is a plate medium, and the vibrio grows in 18–24 hours and gives a clear greenish-yellow zone round the colonies. Other organisms tested did not give this zone, or were inhibited by the malachite green and rosolic acid which the medium contains.

GOHAR (p. 600) describes two ingenious methods for isolating *V. cholerae* details are given in the abstract.

GOHAR and MAKKAWI (p. 705) suggest the use of potassium tellurite, 1 in 50,000, in alkaline peptone water for suppression of intestinal organisms which tend to overgrow the cholera vibrio. They have found it better than the other bacteriostatic substances examined.

Advice on the bacteriological diagnosis of cholera (on lines which have been noticed from time to time in this *Bulletin*) is given in a short article in the *Monthly Bulletin of the Ministry of Health and Public Health Laboratory Service* (p. 336).

Immunity Studies

BURROWS *et al.* (p. 178) have been able to infect mice with cholera vibrios suspended in a solution of mucin, and have used this technique in a protection test of immune rabbit serum. Protective antibody may be in part anti-endotoxic, but is not necessarily identical with O agglutinin. There is little justification for drawing a close analogy between experimental infection and human cholera. [The paper should be read in full.] In a later contribution BURROWS *et al.* (p. 335) deal with the antibody found in the fluid faeces of infected guineapigs (coproantibody). This seems to be identical with serum antibody, though it is not clear how it appears in the faeces ; it has agglutinative and protective properties. The authors discuss the difficult subjects of intoxication, infection and immunity which arise from their experimental work. In a subsequent paper BURROWS and HAVENS (p. 898) show that serum globulin is normally excreted in urine and faeces, and that immune globulin can either be absorbed or excreted through the intestinal wall. The presence of coproantibody in the faeces of immunized animals is related to these processes.

Clinical Findings

MARRIOTT (p. 208) has greatly clarified the symptomatology of cholera by describing the effects of depletion of water and salt respectively. SAFWAT and ADHAM (p. 898) refer to this in pointing out that cholera presents a combination of the picture of both. In water depletion there is thirst, diminished urine, no diminution of plasma volume, no reduction of blood chlorides ; but in salt depletion there is no thirst, no reduction of urine (until late), great reduction of plasma volume and of blood and urinary chlorides. Treatment must take these facts into account. Haemoconcentration is an indication for 400 cc. normal saline for each degree above S.G. 1060, but for simple water depletion only water is needed, by mouth. Acidosis may require intravenous 4 per cent. sodium bicarbonate.

EL-RAMLI (p. 900) gives an account of the signs and symptoms of cholera as he saw them in a large number of cases in a fever hospital in Egypt. He found that 50, 91·7 and 100 per cent. of carriers were free of vibrios in 5, 10 and 15 days respectively. There were 84 healthy carriers in 2,035 contacts, and contacts rarely developed the disease. He gave 400 ml. of normal salt solution intravenously for each degree of blood specific gravity over 1060. Sulphonamides seemed to have no effect.

HASSAN (p. 998) gives a list of the many diseases which may be mistaken for cholera, including uraemia which gives rise to diarrhoea, vomiting, dehydration and acidosis. The investigations of SAFWAT and ADHAM (p. 899) give the impression that uraemia in cholera is not due to any structural change in the kidney, but that the cause is extra-renal ; low blood pressure and disturbance of acid-base balance probably play an important part. There is a picture of renal failure developing rapidly but, in most cases, resolving completely in a short time.

AWNY (p. 899) reports on certain haematological studies made in Egypt. There was leucocytosis even after correction had been made for haemoconcentration, and the red cell sedimentation rate was increased.

BALIGH (p. 999) notes the complications he found in cholera in Egypt. The commonest was heart failure in the acute stage or even in convalescence. Suppression of urine was common before the routine of treatment was fully established; abortion, pneumonia and other conditions are mentioned. A syndrome of transient paralysis complicating cholera, and possibly due to disturbance of potassium metabolism resulting from mobilization of barium from the bone reservoir in dehydration, is described from China by HUANG and MAO (p. 75). It resembles a form of barium poisoning seen in China.

ABDOU (p. 785) thinks that cholera tends to attack persons with schistosomiasis, ankylostomiasis, amoebiasis and malaria rather than those free from these infections, and bases his argument on his own observations in Egypt. He remarks that it was seldom that more than one case occurred in one family.

Treatment

GREPPIN (p. 707) reports on the Swiss medical mission to Egypt, which set up a hospital of 25 beds in the Delta. Treatment consisted of intravenous glucose-saline (5–10 litres in 24 hours), hypertonic saline, sodium bicarbonate for acidosis and infusions of plasma for hypoproteinaemia. The case-mortality rate was 30 per cent., against 50 per cent. elsewhere. A very active phage was isolated, and used to differentiate the Egyptian cholera strains from El Tor and non-pathogenic vibrios.

GOODYEAR and BEARD (p. 160) describe the successful treatment of acute renal failure by peritoneal irrigation, and in comment on this paper, MAEGRAITH suggests that this procedure may have value in the renal failure of blackwater fever and cholera.

SEAL (p. 515) tested sulphaguanidine under field conditions in India, during a number of small outbreaks of cholera; the result showed that the death rate in the sulphaguanidine group was only 1·5 per cent., against 45·5 per cent. in the controls. Most of the patients in the two groups were not given any other effective treatment, but a small number received saline. In spite of this, and of the fact that the test was not done on an alternate case basis, the results are decidedly in favour of sulphaguanidine, stocks of which could be kept in villages for use in outbreaks of this kind. In a small outbreak in Burma STEINITZ (p. 334) reports a death rate of only 4 per cent. as a result of early massive intravenous infusion of glucose saline, and treatment of milder cases with sulphaguanidine. He thinks that the vibrio may have been of low virulence and that preventive inoculation may have contributed to the low death rate. LAHIRI (p. 1000) in India found that both sulphadiazine and sulphaguanidine were valuable in cholera, to about the same extent.

On the other hand, PASRICHA *et al.* (p. 515) conclude, from good clinical evidence, that sulphadiazine has no beneficial effect in cholera, but an extended test showed that sulphaguanidine has considerable value. PASRICHA *et al.* (p. 601) have not found any favourable influence on the death rate by treatment with sulphasuxidine or phthalyl sulphathiazole.

BHATNAGAR *et al.* (pp. 516, 601) write most favourably of their experience with the compound of sulphathiazole with formalin (known as compound 6257), which they used in 85 patients, with only 3 deaths. These patients were treated in their own homes, and no other treatment was given. The drug was given to a total dose of 25–30 gm. in 7 days for a man; there were no toxic effects, and the beneficial effects were usually apparent in a few hours.

Control: Vaccination

In the *Chronicle of the World Health Organization* (p. 174) is an important declaration of international health policy in relation to cholera. It deals with isolation of patients and observation of contacts, disposal of dejecta, disinfection,

control of travel, vaccination etc. It deprecates panic and the over-hasty closure of frontiers, and recommends surveillance for vaccinated travellers and surveillance with medical examination for those who have not been vaccinated.

KOPANARIS (p. 602) gives an account of the steps taken in Greece to prevent the introduction of cholera from Egypt. Travellers from Egypt by sea and air were admitted at one seaport and one airport only, and were examined and if necessary detained. Vaccine was used on a large scale and special attention was paid to persons who lived under unfavourable conditions—sewage workers etc. No fresh food was allowed to be brought from Egypt, and mails were disinfected.

STRAUSS (p. 334) discusses the potential danger to Palestine of the Egyptian outbreak, and SILBERSTEIN (p. 334) the technique of preventive inoculation of heat-killed vaccine.

KHALIL Bey (p. 704) discusses the Egyptian outbreak and the sanitary reforms necessary to prevent repetition. A pure water supply from tube wells is needed in most of the villages.

HALAWANI and OMAR (p. 707) have found that copper sulphate, 20–45 p.p.m. in Nile water, is lethal to *V. cholerae*. It is extensively used to eradicate snail hosts of schistosomes in Egypt, and it has its place in the prevention of cholera.

Moving religious fairs have long been connected with cholera in India, but RAO (p. 896) describes one in Hyderabad in which the incidence was very low, probably because nobody was allowed to join it who had not been vaccinated, and because the wells on the route were treated with permanganate or bleaching powder and great care was taken with the food provided in the villages for these pilgrims.

ADISESHAN *et al.* (p. 336) review the results of inoculation with a single dose of 8,000 million *V. cholerae* (mixed Inaba and Ogawa) in 1·18 million persons in 2,350 villages in India, and compare the cholera experience in these and in a large number of control villages. Incidence rates were 10 and 14 times as high in control as in inoculated groups and villages, and the results appear to provide proof of definite protection. On the other hand, an enquiry into the results of this vaccination campaign made by CHANDRA SEKAR (p. 337) who took as his unit the compact block of a village, inhabited by the depressed classes, showed results which, though still favourable to inoculation, were less so than those quoted above. He found that the attack rate in the control population was 2–4 times as high as in the inoculated.

GOHAR and MAKKAWI (p. 706) show that nearly 20 million people were vaccinated during the outbreak in Egypt, mostly with one dose of 8,000 million organisms; they do not draw conclusions as to the value of vaccination. GOHAR (p. 901) has used an alum-precipitated cholera endotoxoid vaccine in Egypt, which he gave as a single intradermal dose in order to ensure slow absorption. Details of preparation should be sought in the original. GOHAR and ISA (p. 1000) describe their animal experiments with 5 types of vaccines or toxoids from an Egyptian strain of *V. cholerae*. These showed some evidence in favour of a mixture of equal parts of toxoid and vaccine, and the authors give details of the preparation of an alum-precipitated toxoid vaccine mixture.

KORDI (p. 901) gained the impression, from a study of vaccinated and non-vaccinated patients admitted to his hospital in Egypt, that vaccination conferred a definite degree of protection and lowered the fatality rate.

Charles Wilcocks

MALARIA

YACOB, M. & SWAROOP, S. **Preliminary Forecasts of the Incidenee of Malaria in the Punjab.** *Indian J. Malariology.* 1947, Dec., v. 1, No. 4, 491–501, 1 chart.

In thirty districts of the Punjab, the annual incidence of malaria from 1914 to 1943 was correlated with the rainfall in each month of the year. In nineteen of them there was a fair degree of relationship between the rainfall in either March (two districts) April (three districts) or May (14 districts) and the subsequent epidemic incidence. For each of these districts the regression equations were computed, *i.e.* connecting malaria with the rainfall in the specified month. They were used to predict the malaria incidence in 1944, 1945 and 1946 and these predictions could be compared with the actually observed epidemic figures. The degree of accuracy attained was measured by correlating the predicted figures with the observed figures, the coefficients being 0·25 in 1944, 0·76 in 1945 and 0·55 in 1946. The low figure in 1944 was due to unusual floods and waterlogged areas in some districts. The other coefficients are statistically significant. The equations enable forecasts to be made two or three months earlier than has previously been possible and are recommended as a method of estimating the epidemic incidence to be expected.

[The degree of association between prediction and the actual epidemic is not sufficiently close to make the method very reliable in individual districts, as indeed the tabulated figures reveal. It is noticeable that almost all the predictions are too high, and this clearly calls for further study. It is, of course, presumed that the rainfall and the later malaria incidence are linearly related and only one month's rainfall has been utilized. A multiple regression or a curvilinear equation might improve the answer, though the data given do not make it very hopeful.] *A. Bradford Hill*

ZÚNIGA, H. & AGUILAR RIVAS, A. Reconocimiento de malaria de la Ciudad de Santa Ana. Junio de 1946. [**Malaria in Santa Ana, El Salvador.**] *Bol. Sanitario.* San Salvador. 1946, Jan.–June, v. 4, Nos. 1/3, 32–51, 5 charts & 1 map.

The investigation, the results of which are here reported, was undertaken in June, 1946. The authors examined 1,134 persons, schoolchildren and others in the town, for splenic index and found 224 (19·7 per cent.) with enlargement: 661 were examined for parasites and 57 (8·6 per cent.) were positive, most with *P. falciparum* (24), next with *P. vivax* (13), *P. malariae* (4), 16 were not identified; there were no mixed infections recorded. Tables are given to show these indices in the 9 wards of the town. The splenic index was nearly the same in all, but the parasite index varied considerably and was highest in San Lorenzo, Santa Bárbara and Santa Lucía.

According to the statistical returns, malaria comes second or third among the causes of death in Santa Ana; the numbers in the quinquennium 1941–45 were 255, 319, 417, 237 and 203, or, per 10,000 inhabitants, 28, 35, 45, 24 and 21 respectively. The chief *Anopheles* present are *A. albimanus* and *A. pseudopunctipennis*, but the former only is said to be the malaria vector in the town. *H. Harold Scott*

GABALDON, A., with the technical assistance of G. G. DE PEREZ. Mortalidad por malaria en Venezuela. I. Bases estadisticas y distribución geográfica. [**Malaria in Venezuela. Statistics and Geographical Distribution.**] *Tijeretazos sobre Malaria.* Venezuela. 1946, Dec., v. 10, No. 4, 191–237, 10 figs.

The compilation of this paper (it is only the first of a series) must have entailed an enormous amount of work, but one is reminded of Tony Weller's

pronouncement on his efforts to master the alphabet—whether it was worth while to go through so much to learn so little.

The author has presented figures of the population, the births, the deaths from all causes and deaths from malaria and the rates of these for each of 36 years and for each of 21 States in Venezuela. There are seven line maps with shadings to show the mortality from malaria in the different States in successive quinquennia from 1910 to 1936. Much of the information is too detailed to be of more than local interest. Apart, however, from this, the figures as given lose much of their value because it is acknowledged that many births and deaths are not registered, so that the census is inaccurate ; many deaths even when registered are not medically certified ; there must be many cases of malaria not notified and, lastly, in many cases the cause of death is not known with certainty.

With these reservations in mind, serious as they are, but not the fault of, nor remediable by, the author, and not forgetting that fluctuations may be great from year to year, the States may be classified according to the malaria mortality into six groups : 1. Those with figures above 1,000 per 100,000—Anzoátegui, Carabobo, Cojedes. 2. Those with a rate of 750–1,000—Portuguesa. 3. With a rate of 500–750—Barinas, Guarico, Miranda, Monaga and Yaracuy. 4. With 250–500—Apure, Arague, Falcón, Lara, Sucre and Zulia. 5. With 100–250—Bolivar, Táchira, and Trujillo. 6. Below 100—Mérida, Nueva Esparta and Distrito Federal. Speaking generally, malaria is worst on the plains, then in order the valleys, the coastal districts and the south-east [but reference to the maps shows that there are exceptions to this].

H. Harold Scott

Peel, E. & van Hoof, L. Comportement de *Plasmodium falciparum* dans le derme chez l'enfant indigène. [**Behaviour of** *Plasmodium falciparum*, **in the Skin of African Children.**] *Ann. Soc. Belge. de Méd. Trop.* 1948, June 30, v. 28, No. 2, 273–7.

The intradermal juice of 50 African children suffering from *Plasmodium falciparum* malaria was examined. The ages of the children varied from four months to four years. The material was obtained by scarifying the skin, expressing the serum and making films from the first drops of the exudate. The parasites from the skin were compared with those in the peripheral blood and a striking difference was noted. In the blood, practically only ring stages were seen ; in the skin, growth proceeded much further and parasites in various stages of development were encountered. Solid pigmented parasites were common in the skin smears and there was nearly one mature schizont per field of the thin film. The actual number of parasites did not differ in the two situations, and gametocytes were present in both. The authors conclude that the skin is a normal site of schizogony of *P. falciparum* and they note that the picture in the skin resembles that of the placenta or deep organs. They failed to find any forms suggestive of exo-erythrocytic development.

P. C. C. Garnham

Shute, P. G. **The History of a Group of** *Anopheles maculipennis* **var.** *atroparvus* **(3,600 in Number) infected with** *P. vivax* **Malaria.** *Monthly Bull. Ministry of Health & Pub. Health Lab. Service* (*directed by Med. Res. Council*). 1948, Aug., v. 7, 162–5.

The author was a member of the team which, under the leadership of Professor H. E. Shortt, demonstrated for the first time the pre-erythrocytic

stages of *Plasmodium vivax* in man [this *Bulletin*, 1948, v. 45, 482]. In previous work on monkeys, SHORTT, GARNHAM and MALAMOS [*ibid.* 388] had found that it was necessary to induce very heavy infection by the bites of large numbers of mosquitoes infected with *P. cynomolgi* and by injection of sporozoites at the same time, if the pre-erythrocytic stages were to be found easily. A similar technique was used in the experiment in man, and Shute gives in detail the technique adopted for raising the colony of some 10,000 *Anopheles maculipennis atroparvus* [*A. labranchiae atroparvus* in the Bates classification] needed for the experiment, and for infecting the required number on the donor patient. The volunteer recipient was bitten by 1,510 mosquitoes on one day, and by 500 the following day, and the crushed salivary glands of 200 were injected intravenously ; these glands probably contained 9,000,000 sporozoites.

Full details of the procedures adopted should be sought in the original paper.

[The author is not accurate in describing the developmental cycle of *Hepatocystes kochi* (misprinted *kocki*) as the same as that of *P. cynomolgi*. The wording of one paragraph implies that pre-erythrocytic forms of *P. vivax* had previously been found in the livers of monkeys by Garnham and by Shortt and Garnham ; this, of course, is incorrect. Garnham described the exoerythrocytic, hepatic stage of development of *Hepatocystes kochi* in the monkey, and Shortt, Garnham and Malamos the pre-erythrocytic stage of *P. cynomolgi* in the monkey. The slip is obviously unintentional, but an uninstructed reader might receive a wrong impression.] *Charles Wilcocks*

DEL VECCHIO, G. & DEL VECCHIO, V. Prime osservazioni sull'anofelismo in provincia di Salerno. [**Preliminary Observations on Malaria in the Province of Salerno.**] *Boll. Soc. Ital. Biol. Sper.* 1946, Jan.–Feb., v. 22, Nos. 1/2, 7–8. [Summary taken from *Rev. Applied Entom.* Ser. B. 1948, July, v. 36, Pt. 7, 109.]

An Anopheline survey was carried out in 1943–45 in nine communes of the Province of Salerno in which malaria is endemic. Identification of eggs laid by 3,049 females taken during the three years in animal quarters and houses, showed that *Anopheles maculipennis*, Mg., var. *labranchiae*, Flni., *A. m. messeae*, Flni., and *A. m. sacharovi*, Favr (*elutus*, Edw.) represented 48·7, 33 and 11 per cent. of the population, respectively. *A. superpictus*, Grassi, represented only 0·5 per cent. but was the predominant Anopheline in some localities. Others present in small numbers were *A. m. typicus*, *A. m. atroparvus*, van Thiel, *A. m. melanoon*, Hackett, *A. claviger*, Mg., and *A. plumbeus*, Steph. There was an evident association of malaria with *A. m. labranchiae* and *A. m. sacharovi*, which occurred along the coast, where breeding-places of high saline content were available.

OLIFAN, V. I. **Periodicity in the Postembryonic Development of** *Anopheles maculipennis*. *C. R. (Doklady) Acad. Sci. U.R.S.S.* Moscow. 1947, v. 55, No. 2, 169–72, 2 figs. [12 refs.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1948, Aug., v. 36, Pt. 8, 140.]

Larvae of *Anopheles maculipennis* vars. *messae*, Flni., and *atroparvus*, van Thiel, were reared in tap water with yeast, infusoria and flagellates as food, and their respiration and rate of growth were observed. Measurement of the stigmatic and cutaneo-branchial respiration with a microspirometer gave the consumption of atmospheric oxygen and of that dissolved in water, respectively. The changes in respiration that took place with the increasing age in one set of tests are shown on a graph. It was found that respiration did not increase

steadily with the age of the larvae but showed a succession of increasingly high peaks separated by depressions. As a rule, the depressions more or less coincided with the moulting periods, and the peaks with the middle of each instar. In some of the experiments, however, a peak was preceded by a deep depression in addition to that occurring during the moulting period. There was a particularly high peak in the third instar.

The growth of the larvae was studied by measuring their length each day and computing the true growth-rate to obtain a graphic representation of the changes that took place with age. The resulting curve showed a succession of decreasing peaks, indicating that the increase in length of the larvae with age was of an intermittent character ; growth was considerably slowed down soon after the beginning of the third instar owing to accelerated differentiation, and this instar was preceded by unusually high mortality.

It is concluded that there is a definite rhythm in the intensity of respiration and growth in the larvae of *A. maculipennis* corresponding to profound changes in their metabolism and that the intensification of growth at the beginning of the third instar and of oxygen consumption in the course of it is suggestive of the particular importance of that instar. The periodicity observed in growth and metabolism is thought to be controlled by the rate of production of hormones.

STEYN, J. J. **The Effect on the Anopheline Fauna of Cultivation of Swamps in Kigezi District, Uganda.** *East African Med. J.* 1946, June, v. 23, No. 6, 163–9.

Kigezi is a densely populated mountainous district in south-west Uganda. It lies at an altitude of 6,000 feet and has an average annual rainfall of 39·13 inches. Famine is apt to occur during drought years, consequently drainage of the papyrus swamps in the valleys was commenced in 1942 with the object of extending the area available for cultivation. A great increase in the incidence of malaria followed and investigations showed that the following anophelines were present : *Anopheles christyi*, *A. marshalli gibbinsi*, *A. coustani* and *A. demeilloni*.

Previous workers had already shown that *A. christyi* was the commonest anopheline in African huts in the area and dissections produced an average gland infection for this species of 2·36 per cent. with a maximum at one place of 4·1 per cent. out of 98 females dissected.

The present author, therefore, in 1944–45, made weekly collections of anopheline larvae by a standard technique in five areas in which were sixty actual or potential breeding places in uncultivated swamp and eighty-seven in cultivated portions. He also made weekly collections of adults in twenty-four African huts. Results of adult catches are not given, but an analysis of 2,922 larval searches in untouched swamps and 5,886 searches in the cultivated portions is tabulated. The figures show that after cultivation there was a decrease in the numbers of *A. marshalli gibbinsi*, an increase in *A. coustani* and a much greater increase in the output of *A. christyi*.

Several breeding places of *A. christyi* are noted, but it is pointed out that it breeds particularly in cultivated ditches and disappears from them when they revert to swamp ; also in water in paths through papyrus and where papyrus has been cut down, but as the papyrus begins to grow again the numbers of larvae fall. The number of favourable breeding places was also greater in cultivated than in uncultivated swamps.

The author concludes that as the cultivation of swamps as at present practised in Kigezi greatly increases the breeding of *A. christyi*, the increased incidence of malaria in this area is largely due to this cause. *H. S. Leeson*

GARNHAM, P. C. C., WILSON, D. Bagster & WILSON, Margaret E. **Malaria in Kigezi, Uganda.** *J. Trop. Med. & Hyg.* 1948, Aug., v. 51, No. 8, 156–9.

During a visit to Kigezi, in south-west Uganda, in September, 1946, very high spleen rates were observed among all age groups of the population. A second visit was made in January, 1947, to study this phenomenon and its relationship to *Anopheles christyi*, recently recorded as a vector [above].

The area surveyed lies at an altitude of about 6,300 feet where the incidence of malaria had increased after intensive cultivation. Around Lake Bunyonyi, the huts contained numerous *A. funestus*; the dissected salivary glands of 275 females showed six with sporozoites (2·2 per cent.); a few larvae of this anopheline were found among papyrus at the fringe of the lake. Huts in the Kigezi valleys, where previous workers had found many *A. christyi*, yielded only two specimens of this species, and one *A. gambiae*, one *A. funestus*, nine *A. kingi* and three *A. marshalli* var. *gibbinsi*.

Spleen rates and parasite findings are tabulated and show that the spleen rates were high for such an altitude; that the adult parasite rates were not very different from those in hyperendemic areas; and that there was a high incidence of *Plasmodium malariae*.

The authors make some detailed suggestions, firstly, for an investigation into the malaria situation to determine the part played in transmission by *A. christyi*, *A. gambiae* and *A. funestus* in such areas and secondly for certain experiments in anopheline and malaria control. *H. S. Leeson*

GLAGOLEVA, E. M. [**Ecological Studies on *Anopheles* Larvae in Tadzhikistan, Middle Asia. 3. Breeding Places of *Anopheles hyrcanus* Pall. and their Chemical Factors.**] *Rev. Ent. URSS.* 1947, v. 29, Nos. 1/2, 109–18. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1948, July, Pt. 7, 124.]

Anopheles hyrcanus, Pall., is widely distributed and common in the lowlands in Central Asia. In Tadzhikistan, it is abundant in low-lying places in the valleys of the rivers Vakhsh, Kzuil-su and Ak-su and in the valleys of the Hissar mountains, its favourite breeding places being rice-fields and swamps fed by seepage from subsoil water lying close to the surface, in which the water is slow moving, heated by the sun and overgrown with floating and emergent vegetation and dense growths of reeds.

A study of the chemical composition of the water in typical breeding places was carried out in 1938–40 in rice-fields on four collective farms in three districts, and a detailed account is given of the results. They showed that it was characterized by a low content of minerals (190–250 parts per million dry residue), a low degree of hardness, a fairly high oxygen content (4·15–25·16 p.p.m.), a pH of 7–7·4, and a high temperature (30°C. [86°F.]), all typical of high-level subsoil water.

Larvae of *A. hyrcanus*, unlike those of other species of *Anopheles*, tolerate considerable quantities of both mineral and organic nitrogen and were not affected by about 4·24 p.p.m. nitrates in the water. In tests of various methods of reducing the mosquito population in rice-fields, the introduction of organic fertilisers killed the larvae of all the species of *Anopheles* present except those of *A. hyrcanus*.

LEESON, H. S. & THEODOR, O. **Mosquitos of Socotra.** *Bull. Entom. Res.* 1948, Aug., v. 39, Pt. 2, 221–9, 4 figs. (1 map). [15 refs.]

The paper contains an introductory account of the surface features and water supplies of the Island of Socotra. It seems that a fairly complete survey of

mosquitoes was carried out in the war period and that only two species of *Anopheles*, *A. dthali* var. *wardi* and *A. culicifacies* var. *adenensis*, were discovered. The former is here described as a new variety with an account of the adult male and female and of the structure of the larva. This insect is widely distributed in the island and occurs in water of many types. The following Culicines which might prove to be of some medical importance were found to be present: *Aëdes vittatus*, *Culex fatigans* and *Culex sitiens*. *Aëdes aegypti*, which had been recorded from Socotra years ago, was not encountered. The paper contains keys to adults and larvae. *P. A. Buxton*

DE BURCA, B. & JACOB, V. P. **Further Notes on Malaria in Fort Sandeman.** *Indian J. Malariology*. 1947, Dec., v. 1, No. 4, 413–16.

"In a survey carried out between mid-August and mid-October 1946 at Fort Sandeman, *A. stephensi* and *A. culicifacies* were found infected, gland infections in each case. No other mosquitoes occur in sufficient numbers to be of any practical importance.

"The Zhob River was not considered to have any bearing on the malaria problem in this station during the period of the survey."

DE BURCA, B. & FORSHAW, H. W. **Winter Variations of the Larva of *A. fluviatilis* from Northern India and Bombay Presidency.** *Indian J. Malariology*. 1947, Dec., v. 1, No. 4, 417–18.

"A brief description is given of some winter variations noted in the larva of *A. fluviatilis* during the cold season of 1945–46 in North India (U.P.) and Bombay Presidency (Poona). A large proportion of larvae were found with branched outer or inner clypeals. A division of the outer clypeals with two equal branches was the commonest variation seen, and often this was unilateral."

SANDOSHAM, A. A. **Identification of the Common Malayan Anophelines.** 25 pp., numerous illustrations. 1945. Singapore.

——. **The Identification of the Common Anophelines of Malai and Thailand.** 95 pp., 17 figs. & 3 pls. 1945. Singapore. [Summary taken from *Rev. Applied Entom.* Ser. B. 1948, July, v. 36, Pt. 7, 112.]

The first booklet comprises data on the morphology of the various stages of *Anopheles* in general and illustrated keys for the identification with simple equipment of the larvae and adults of both sexes of the 17 species of that genus that are common or important in Malaya, together with brief notes on their morphology, prevalence, biology and status as vectors of malaria there.

The second includes also most of the other information on *Anopheles* (except control measures) contained in the author's recent monograph on malaria in Malaya [this *Bulletin*, 1948, v. 45, 1045] and in addition a list of the species and subspecies recorded in Siam and a summary of the available information on the morphology, prevalence, bionomics and status as vectors of malaria of ten species or subspecies common, widespread or important in Siam but not in Malaya. The keys to the larvae and females are amended to include these ten forms. The distribution of malaria and its probable vectors in Siam are discussed, mainly from the literature. Intense malaria in the hilly districts to the west of the central plain is associated with the breeding of *A. fluviatilis*, James, *A. culicifacies*, Giles, and *A. minimus*, Theo., and 14 or 15 other species occur in the area, including *A. barbumbrosus*, Strickl. & Choudh., and *A. insulaeflorum*, Sw. & Sw., which are recorded from Siam for the first time.

CORRADETTI, A. Osservazioni sulle preferenze alimentari dell'*Anopheles pseudopunctipennis* e dell'*Anopheles punctimacula* nel Perù. [**Observations on the Feeding Preferences of** *Anopheles pseudopunctipennis* **and** *A. punctimacula* **in Peru.**] *Riv. di Parassit.* Rome. 1948, Sept., v. 9, No. 3, 129–35. English summary (7 lines).

The English summary appended to the paper is as follows:

"Precipitant reactions have been undertaken by the author to determine the source of blood sucked by a total of 671 *A. pseudopunctipennis* and 62 *A. punctimacula* caught in two different regions of Peru (on the coast and on the eastern slope of the Andes). It has been noted that *A. pseudopunctipennis* of the eastern slope of the Andes shows a tendency to bite man greater than *A. pseudopunctipennis* of the coast. It has been further noted that *A. punctimacula*, which is found in the coastal region only, also presents a remarkable degree of androphilism."

ANZOLA FALCON, T., GOMEZ MARCANO, A. & LOPEZ, J. A. Infección oocistica natural de los anofelinos venezolanos: investigaciones durante el trienio 1944–1946. [**Natural Oöcyst Infections of Venezuelan Anophelines observed in 1944–1946.**] *Tijeretazos sobre Malaria.* Venezuela. 1947, Mar. & June, v. 11, Nos. 1/2, 41–2.

In the field and in the Malaria Laboratory at Maracay, during the three-year period of 1944–1946, the authors and their staffs dissected 2,762 stomachs of 15 species of anophelines, captured in houses by day. Oöcysts were found in two species only, *A. darlingi* (4 out of 1,374) and *A. albimanus* (1 out of 274). The epidemiological importance of these two species as general vectors is stressed. The other species included familiar South American anophelines: it is considered probable that some of the latter are vectors of "discrete focal transmission". *H. J. O'D. Burke-Gaffney*

HARLEY-MASON, J. **Melanin and its Precursors. Part I. The Synthesis of 5 : 6 : 5′ : 6′-Tetrahydroxyindigo.** *J. Chem. Soc.* 1948, Aug., 1244–7.

KNISELY, M. H., BLOCH, E. H., ELIOT, T. S. & WARNER, Louise. **Sludged Blood.** *Science.* 1947, Nov. 7, 431–40, 1 fig. [53 refs.]

This paper is a review of the work of Dr. Knisely and his associates with regard to the direct observation of blood flow in small vessels within living tissue. The possible significance of widespread intravascular agglutination of erythrocytes to form what the author has termed "sludge" is discussed in detail and a plea is made for further investigation of the importance of this phenomenon in a variety of diseases and pathological states including old age. The paper is itself in the nature of a summary of the observations and conclusions of the authors and cannot adequately be further condensed here. Those interested should read the original, the closing paragraphs of which are as follows:—

"When one considers the numbers of already observed pathologic conditions during which a sludge was present, the fact that many sludges could be expected to do at least small amounts of permanent damage to the body, the fact that these damages must be cumulative over a long period, and the pitiful mental incompetence of the prematurely senile and of many aged persons, it becomes obvious that we now need to begin to determine carefully how all the damages done to the body by sludges can summate as parts of the aging processes. In which different and overlapping combinations can the anatomical and physiological decrements caused by sludges, and readjustments to these,

summate over periods of years ? How rapidly can they add up over short periods ? How do these factors cumulate along with other nonsludge factors in the various aging processes ?

" The observations, experiments, and deductions outlined above are evidence that the sludges provide a common, easily understandable set of factors whereby many diseases can and do damage the bodies of animals and man. One great hope provided by these studies is that, as we learn how to keep blood normally unagglutinated and fluid, vessel walls intact, normal red cells from being destroyed, and adequate blood volume present, many effects of other pathologic mechanisms will stand out clearly, unobscured by the sludge mechanisms. Each will, of course, then receive the undivided attention it merits. The sludges are now ready for study by all the intensive investigative methods our age affords."

[It is possible that the phenomenon of sludge formation may be a factor of some significance in the pathogenesis of the tissue lesions of certain tropical diseases, for example trypanosomiasis or malaria. The authors state that it occurs in the late stages of simian and bird malaria. One can imagine such intravascular agglutination interfering considerably with the oxygenation, in the lungs, of the individual corpuscles constituting the sludge and with the blood flow through the small vessels of the lungs and other tissues. In assessing its importance in the disease, however, one must have regard to the time relations of sludge formation. It apparently occurs extensively only late in the disease and its non-specificity (as demonstrated by the authors of the above paper) and late appearance suggest that it may be itself the product of severe anoxia and thus only complicate and not initiate tissue changes which are in progress before its appearance. Intravascular agglutination of the type described by Knisely has in fact been reported in severe anoxic states (Liebesny, *Wien. med. Woch.*, 1921, v. 71, 2177 ; *Münch. med. Woch.*, 1922, v. 69, 648 ; Schneider & Truesdell, *Amer. J. Physiol.*, 1924, v. 71, 90). Nevertheless, it is clear that formation of sludge, if appearing early enough in the course of the disease, would have a significant effect on the circulation in the smaller blood vessels, and thus on the oxygenation of the tissues. The authors are right to emphasize the importance of acquiring further information.]

B. G. Maegraith

Winckel, C. W. F. **Is it possible to provoke an Attack of Malaria ?** *J. Trop. Med. & Hyg.* 1948, Sept., v. 51, No. 9, 178–83, 5 figs. [11 refs.]

There is never any certainty that all malaria parasites are killed after the usual treatment. With *P. vivax* a number of relapses may occur for one or two years, and with *P. malariae* for a much longer time. With *P. falciparum*, a well-treated case is much less likely to relapse. Thick drop examinations in an endemic area will show that some (even a large proportion) of the population are symptomless carriers ; but at any time, for some reason or other, the equilibrium between host and parasite is upset and an attack of malaria occurs. The usual opinion is that recrudescences and relapses may take place often without any known cause, but also occur after certain unfavourable influences which deprive the patient of his power of resistance. The author notes that the native strain of *P. vivax* in the Netherlands is unable to cause an attack in the winter, but suddenly becomes active when the weather turns warmer, the cause of this phenomenon being really unknown. Korteweg (*Geneesk. Bladen uit Kliniek & Labor*, 22nd ser., No. 1) thinks that the toxins of acute infections counteract the revival of malarial parasites. British and American writers do not usually consider active provocative methods except as procedures of

doubtful value in diagnosis. While many observers think that a major operation or parturition may precipitate an attack of malaria, others doubt the importance of these factors.

The case histories of 1200 paretics treated in Amsterdam with induced malaria have been studied (almost all were apparently infected with *P. vivax*, although one case of *P. malariae* is noted). This treatment aims to give the patient 10 or more pyrexial attacks, but may fail because of an immunity from malaria previously accidentally acquired or arising from malaria therapy. During the course of infection with induced malaria, immunity may become so marked that after a few attacks the fever suddenly or gradually decreases and soon disappears altogether, while in the blood parasites decrease or disappear completely. Inoculation with a different strain of *P. vivax* proved unsatisfactory in such cases and so did injections of adrenaline and application of artificial sunlight. Injections of milk, serum, pyrifer (bacterial proteins), dmelcos (a suspension of *B. ducreyi*) or sulphosine (a suspension of sulphur in oil), nearly always caused some degree of fever, but even then had no influence on the number of parasites in the blood.

A summary of 24 paretic cases (one infected with *P. malariae*), whose immunity brought about a premature end to their treatment, leads to the conclusion that, if a patient develops resistance to malaria to such a degree that attacks of fever cease and parasites disappear nearly or completely, provocative methods hardly ever succeed. Immunity often does not occur until the fever cure is interrupted by small doses (0·5 gm.) of quinine, or neoarsphenamine (0·15 to 0·3 gm.), according to the strain of *vivax* used.

The author concludes that once the infection has become latent by the patient's immunity, it can rarely be activated by provocative measures within a reasonable time. In natural benign tertian malaria, supposed provocative measures are far less important than is usually assumed. [In endemic areas there is always the difficulty, if not impossibility, of distinguishing between relapse and reinfection.] *C. F. Shelton*

Limbos, P. Présence de schizontes et de gamètes de *Plasmodium falciparum*, dans le sang périphérique, vingt-deux heures après la naissance. [**Schizonts and Gametocytes of *Plasmodium falciparum* in the Peripheral Blood Twenty-two Hours after Birth.**] *Ann. Soc. Belge de Méd. Trop.* 1948, June 30, v. 28, No. 2, 269–71.

A case of congenital malaria due to *Plasmodium falciparum* is described from the Belgian Congo. The mother, an African primipara, had suffered from two attacks of malaria during pregnancy and had another attack on the first day of the puerperium, when scanty asexual forms of *P. falciparum* were found in a thick drop of blood. Labour was uneventful, though the placenta was unusually friable and had numerous blackish haemorrhagic patches. Twenty-two hours after birth, the child had generalized convulsions ; quinine was given by mouth for a week and no further symptoms developed. The child's blood (thick drops) showed scanty asexual and sexual parasites of *P. falciparum*, and in a thin smear the latter forms alone. This is claimed to be the first record of the discovery of gametocytes of *P. falciparum* in the blood of a child within twenty-four hours of birth. [These findings strongly suggest that intra-uterine malaria occurred, because gametocytes of this species of malaria are rarely found in infections younger than a week. Unfortunately, neither the blood of the umbilical cord nor that of the placenta was examined.] *P. C. C. Garnham*

JORDAN, W. S., Jr. **Primary Attack of Vivax Malaria occurring Twenty-seven Months after Infection.** *New England J. of Med.* 1948, Sept. 9, v. 239, No. 11, 397–9. [16 refs.]

This paper records the case of a United States ex-serviceman who developed an attack of *P. vivax* malaria in Cleveland, Ohio, in December 1947. He had served in New Guinea and the Philippines from 1943–1945; he had never been in hospital, nor had he had any symptoms suggestive of malaria.

The author produces arguments in support of the proposition that this was a primary attack of malaria and he discusses the literature regarding delayed primary attacks and late relapses.

This patient had taken suppressive mepacrine daily until his return to the United States in September 1945. It is suggested that the drug was responsible for the delayed attack of malaria, which had occurred as long as 27 months after the patient's last known exposure in an endemic area. It is added that such prolonged latent periods have not been reported in natural malaria, and that symptoms of the disease usually appear much earlier after the discontinuance of suppressive mepacrine. The author points out that rare cases of malaria have apparently been acquired in Cleveland, and that there is a possibility that this patient had contracted the infection locally: but against this were the time of year (December), the known exposure in an endemic area, and the presence of splenomegaly. *H. J. O'D. Burke-Gaffney*

See also p. 96, WOLFF, **Een eenvoudige snelle kleuring voor bloedonderzoek op malariaparasieten.**

See also p. 21, CORKILL. **Activation of Latent Kala-Azar and Malaria by Battle Experience,** and p. 22 CORKILL. **Activation of Latent Kala-Azar by Malaria and Relapsing Fever.**

WINCKEL, C. W. F. Le traitement du paludisme par la quinine. [**The Treatment of Malaria with Quinine.**] *Rev. Paludisme et Méd. Trop.* 1948, Oct. 15, v. 6, No. 53, 231–52, 2 figs. [Refs. in footnotes.]

ASQUITH, R. S., HAMMICK, D. L. & WILLIAMS, P. L. **The Conversion of Mepacrine and Similar Derivatives of 5-Aminoacridines into Thioacridones by the Action of Hydrogen Sulphide.** *J. Chem. Soc.* 1948, Aug., 1181–3.

DELAHOUSSE, J. Essai d'étude de l'activité thérapeutique de la Nivaquine (3038 RP) sur le paludisme à *Plasmodium falciparum*. [**Therapeutic Effect of Nivaquine (3038 RP) in *Plasmodium falciparum* Malaria.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1947, v. 4, No. 3, 203–6.

The author refers to the work on Nivaquine in the prevention and treatment of malaria in North Africa by DECOURT and SCHNEIDER [this *Bulletin*, 1948, v. 45, 148, 868].

The present experiments were carried out in Ségou, French West Africa, and concerned the treatment with Nivaquine of 46 cases of subtertian malaria. The ages of the patients [presumably all Africans] varied from 7 months to 45 years. Two-thirds of those treated were children under 8 years. The author points out that the experiments were of limited value, as they were of short duration, the patients were not severely ill and only Nivaquine for oral administration was available.

Dosage was based on an adult dose of 0·3 gm. daily, given in the morning in capsules containing 0·1 gm. each. The temperatures and thick blood films were taken every 12 hours. The results of 46 patients so treated are shown in a table.

Only one complete failure was recorded, that of a child of 2 years, in whom schizonts persisted after 5 days of treatment. One child of 6 years relapsed after 4 weeks. Otherwise results were very satisfactory: temperatures returned to normal in an average of 30 to 36 hours, that is after the second dose; and parasites disappeared from the peripheral blood in 30 to 60 hours, after the third dose. No toxic effects were noted. The drug had no effect on gametocytes and required to be supplemented with rhodopraequine [resembling plasmoquine]. The treatment had little effect on splenomegaly.

The author thinks, as a result of these experiments, that Nivaquine is almost equally as effective as mepacrine when given by the mouth. It has the advantages of low toxicity, of being colourless and of being put up conveniently in capsules. *H. J. O'D. Burke-Gaffney*

King, H. & Wright, Jean. **Antiplasmodial Action and Chemical Constitution. IX. Carbinolamines derived from 6 : 7-dimethylquinoline.** *Proc. Roy. Soc.* Ser. B. 1948, Oct. 26, v. 135, No. 880, 271–92. [20 refs.]

See also p. 26, Nicholson, Gaines, McWilliams & Vetter. **Combined Typhus-Malaria Control Residual Spray Operations with Five Percent DDT Emulsion.**

Aziz, M. **Interim Report on Island-Wide Anopheles (Malaria) Eradication Programme for the Year 1947.** *Cyprus Ann. Med. & San. Rep. 1947.* Appendix F. pp. 18–32, 11 graphs & 1 map.

The campaign for eradication of mosquitoes from Cyprus was begun in 1946 and the results of the first year's work are described in earlier papers [this *Bulletin*, 1948, v. 45, 152]. The work in 1947 was extended to cover more than half the island, including an area of about 2,000 square miles. The same methods were used, but the staff had to be expanded from about 100 to over 400 to cope with the increased area. About 7½ tons of DDT dissolved in 270 tons of gas oil were used. Total expenditure amounted to about £75,000.

As the work proceeded through the year a greater and greater proportion of blocks in the eradication area were found negative for anophelines; whereas in the western end of the island, in which merely regular control measures were maintained, a very high proportion of areas were positive. The checking of breeding and resting places was maintained in the Karpas peninsula (1946 eradication area). This remained nearly free throughout the year, though a few blocks were reported positive in August.

As a result of the eradication scheme, the malaria incidence as reflected in new acute cases, in blood and spleen indices, has been brought almost to extinction in the eradication areas. It is, however, shown that there has been a gradual decline in malaria since 1944, even in the " control " area of the island. *J. R. Busvine*

Viswanathan, D. K. & Ramachandra Rao, T. **Control of Rural Malaria with D.D.T. Indoor Residual Spraying in Kanara and Dharwar Districts, Bombay Province. First Year's Results.** *Indian J. Malariology.* 1947, Dec., v. 1, No. 4, 503–42, 1 map & 3 charts (2 folding). [13 refs.]

This paper should be consulted in the original by all concerned in malaria control by DDT residual spray in the Eastern hemisphere. It constitutes a report on the largest successful scheme yet undertaken by this means. Work is being done in two districts of Bombay Province with a total population of 1,642,173 of whom 725,179 lived in places where malaria was sufficiently

endemic or hyperendemic to demand control, The country falls into three natural types, in one of which there is little malaria, in another of which it is predominantly carried by *A. fluviatilis* a notorious anthropophilic vector mainly breeding in streams and seepages, and in the third it is carried by *A. culicifacies*, a more omnivorous species commonly associated with pools.

Much experimental work has been done in this district and malaria control by prevention of breeding has proved impossible at the cost which could be envisaged. DDT residual spraying was started in 1946–47. The dosage applied is 56 mgm. DDT per square foot (2 oz. per 1,000 square feet) in the form of a soap emulsion in water of a concentrated solution of DDT in medium kerosene extract, a petroleum fraction with a high aromatic content. In the areas affected by *A. culicifacies* applications were made, at intervals of six weeks, to all human and animal shelters up to ceiling height or the maximum reach of the operator. In those affected by *A. fluviatilis*, applications were made at intervals of two months to human and mixed habitations only up to a height of 10 feet. The cost of treatment worked out at two annas (2·7 pence) per person protected per round, or six annas (8·1 pence) per year.

The results have only been followed for one year. In the areas affected by *A. fluviatilis* where some previous control by other means had been carried out the spleen rate has dropped from 72·2 per cent. to 14·4 per cent., and the parasite rate from 14·6 per cent. to 3·5 per cent. In those affected by *A. culicifacies* where there had been no previous control the drop in the spleen rate is from 28·3 to 19·6 per cent. and in the parasite rate from 7·5 to 4·4 per cent.

In both areas an effort was made to estimate the infant parasite rate, but controls were difficult as villages were only left unsprayed either because they were non-malarious or because they were very small and inaccessible. In the *culicifacies* area, no infections were found among 237 children examined, and in the *fluviatilis* area three were found among 367 children. For the reasons stated, the controls also showed very low figures of 2·1 per cent. and 13·33 per cent. *G. Macdonald*

Afridi, M. K. & Singh, D. **A Scheme for the Control of Malaria in Villages in Delhi Province.** *Indian J. Malariology*. 1947, Dec., v. 1, No. 4, 423–40, 2 maps.

This paper gives a description of the organization but not the results of malaria control by residual DDT spraying in the villages of Delhi Province, which have a population of 292,102 subject in varying degrees to epidemic malaria at the height of the summer. Many surveys and many schemes of control have been carried out before, the most hopeful being by pyrethrum spraying. Under the new organization staff is more elastic than before. DDT is applied in a number of forms and doses varying from 50 mgm. per square foot (2 oz. per 1,000 sq. ft.) as a suspension, to 10 mgm. (0·4 oz. per 1,000 sq. ft.) as an emulsion. Two applications at intervals of six weeks are given to places where the spleen rate exceeds 20 per cent., and one application to places with spleen rates between 5 and 20 per cent. The estimated annual cost *per caput* works out at 7·8 annas (10·4 pence). *G. Macdonald*

Rao, V. V. & Ramakrishna, V. **Control of Breeding of *A. sundaicus* by *Eichhornia*-Cover.** *Indian J. Malariology*. 1947, Dec., v. 1, No. 4, 419–21.

"In Orissa Coast, the presence of *Eichhornia speciosa* does not inhibit the growth of other aquatic vegetation nor does it prevent the breeding of *A. sundaicus*. The experiences are at variance with the observations made in Bengal." [See also this *Bulletin*, 1947, v. 44, 564.]

BALL, G. H. **Extended Persistence of *Plasmodium relictum* in Culture.** *Amer. J. Trop. Med.* 1948, July, v. 28, No. 4, 533–6, 3 figs.

"Oocysts of *Plasmodium relictum* attached to the stomach wall of *Culex tarsalis* have been maintained in culture for 20 days. No development was visible in the cultured oocysts."

SALZER, W., TIMMLER, H. & ANDERSAG, H. Ueber einen neuen, gegen Vogelmalaria wirksamen Verbindungstypus. [**A New Compound effective against Bird Malaria.**] *Chem. Berichte.* 1948, Jan., v. 81, No. 1, 12–19.

BLACKWATER FEVER

FLUSSER, J. & VRZALA, K. Biliosní horečka haemoglobinurická u malarie terciany. [**A Case of Blackwater Fever and Benign Tertian Malaria.**] *Časopis Lékařů Českých.* 1948, July 9, v. 87, No. 29, 829–32, 2 figs. & 1 chart.

The English summary appended to the paper is as follows:—

"A typical case of blackwater fever in a 13 year old Roumanian immigrant, who had not been treated for malaria yet, is described. Plasmodium vivax was found in the blood. During treatment with Penicillin a rapid regression of the majority of signs was noted."

SKEGGS, L. T., Jr. & LEONARDS, J. R. **Studies on an Artificial Kidney: I. Preliminary Results with a New Type of Continuous Dialyzer.** *Science.* 1948, Aug. 27, 212–13, 1 fig. [16 refs.]

TRYPANOSOMIASIS

PACKCHANIAN, A. **The Fate of some Pathogenic Trypanosomes in *Triatoma* and *Ornithodorus*.** *Amer. J. Trop. Med.* 1948, July, v. 28, No. 4, 541–3.

"1. *Trypanosoma brucei*, *Tr. gambiense*, and *Tr. hippicum* survived only four to six days in *Triatoma*. The majority of the flagellates were found dead after two to four days. At the end of ten days no flagellates were found viable by either microscopic examination or animal inoculation test.

"2. *Tr. brucei*, *Tr. gambiense*, and *Tr. rhodesiense* likewise failed to multiply in soft ticks (*Ornithodorus turicata*). The flagellates remained viable from two to four days, but at the end of ten days all trypanosomes were found dead or disintegrated. The animal inoculation tests were likewise negative for seven days and after.

"3. It is concluded that neither *Triatoma* nor *Ornithodorus* will play any major role in the transmission of African sleeping sickness, nagana, or murrina."

VANDERPLANK, F. L. **Experiments in Cross-Breeding Tsetse-Flies (*Glossina* Species).** *Ann. Trop. Med. & Parasit.* 1948, Sept., v. 42, No. 2, 131–52, 2 figs. [25 refs.]

The author has carried out a large amount of work on cross-breeding between different species and sub-species of *Glossina*. The paper does not deal with the possible use of this method for controlling *Glossina* in the field [see this *Bulletin*, 1948, v. 45, 51].

It will be remembered that if one puts a male and virgin female of different species or sub-species of tsetse in a cage, complete failure to mate may occur. But in many cases, the insects pair though the female does not produce larvae : occasionally hybrid offspring are produced which are nearly always sterile. A female which has paired with a " different " male cannot subsequently mate with a male of her own species and is in fact sterilized.

The paper sets out the results of more than a hundred types of crossing which involve the use of twelve species of *Glossina* and over three thousand individuals. Failure to produce living issue is due to a variety of causes ; among them mechanical difficulties in pairing, failure in fertilization of the eggs, failure of the larva to develop, and so forth. The author makes use of a number of ingenious techniques. He says that individuals of two species will not mate unless the right musical note which comes from the wing beats of the female is produced : apparently it is possible to produce the correct note mechanically, and this is followed by pairings which would not otherwise occur. He has been able to remove eggs from a virgin female, mix them with sperm and incubate them on agar. If the parents are of the same species or sub-species, eggs will develop to the hatching stage in 100 per cent. of cases.

In nature the range of certain related species overlaps : this is true for instance of *swynnertoni* and *morsitans* in a few places, and it is known that in the laboratory cross-pairing between them occurs readily with an effective sterilization of the female. In some of these areas aberrant adult tsetse have been taken which are probably natural hybrids. The author suggests that *Glossina newsteadi* may perhaps not be a species in the accepted sense of the word, but a naturally occurring hybrid between *G. caliginea* and either *pallicera* or *palpalis*. He discusses the status of sub-species in *Glossina* and the general relation of the three groups which are recognized in the genus to one another. The paper is of considerable interest to geneticists. *P. A. Buxton*

VILAIN, P. Note sur l'application du " Sélective Clearing " dans la région de Gaoua (Secteur spécial No. 9). [**The Use of " Selective Clearing " in the Gaoua Region.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1947, v. 4, No. 3, 289–91.

The paper describes the use of " selective clearing " against *Glossina palpalis* in the Gaoua region, Upper Volta Province, French West Africa. The author has received much help from MORRIS, whose work on similar problems in the Northern Territories of the Gold Coast is familiar [this *Bulletin*, 1946, v. 43, 537 ; 1947, v. 44, 51]. Fly is confined to narrow riverside belts, in which contact with man is close, as people live on the waterside. By destroying certain types of waterside bushes and trees, tsetse may be exterminated. It seems that no great amount of clearing has yet been carried out. The cost is five to six thousand francs per kilometre, to include both banks of a stream.
P. A. Buxton

ROUBAUD, E. Transmission cyclique à Paris de *Trypanosoma congolense* Broden, par des *Glossina palpalis* importées du Congo belge ; xénodiagnostic de l'infection transmise. [**Cyclic Transmission in Paris of** *Trypanosoma congolense* **Broden, by** *Glossina palpalis* **imported from the Belgian Congo : Xenodiagnosis of the Transmitted Infection.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 405–13, 2 figs.

GUYAUX, R. Observations cliniques sur l'emploi en milieu indigène du dimidium bromide dans un foyer actif de trypanosomiase bovine. [**Observations in the Field of the Clinical Use of Dimidium Bromide (Phenanthridinium) in an Active Focus of Bovine Trypanosomiasis.**] *Ann. Soc. Belge de Méd. Trop.* 1948, June 30, v. 28, No. 2, 179–88, 3 figs.

OSIMANI, J. J. Resultados obtenidos con el uso de la fijación del complemento en el diagnóstico de la enfermedad de chagas. [**Complement Fixation in Chagas's Disease.**] *Arch. Uruguayos de Med., Cirug. y Especialidades.* 1947, Sept., v. 31, No. 3, 125–56. [Bibliography.] English summary.

For antigen the author used extracts of the spleen of a dog infected with *T. cruzi*. He prepared 21 stocks of " moist antigen " obtained by macerating the spleen in water with one-third glycerin and a small quantity of phenol; and 15 stocks of " dry antigen " by triturating *in vacuo* at low temperatures. [Details of the preparation are not given in this paper; it is stated that " methods of preparation and technique of the test are described elsewhere."]

In all, 463 sera were tested: 320 from healthy subjects or those suffering from diseases other than Chagas's disease; 100 syphilitics giving a positive Wassermann reaction, and 43 with Chagas's disease proved by blood examination or by xenodiagnosis.

Cases of the disease are subdivided into three groups: 1. Those with fever, adenopathy and splenomegaly, the acute initial stage of the infection usually on the 18th or subsequent days. 2. The " latent period ", a not very definite period between the acute early stage and the later tertiary stage. It corresponds to what has been called the " subacute form " of the disease. 3. The tertiary period with cardiac changes—the chronic form of the disease.

Of 13 in the first and early second stages, *i.e.* within a year of onset, tested with the moist antigen 12 were positive, and of 10 tested with the dry antigen 7 were positive. Seven were tried with both antigens and, with one exception, the results were identical; this one gave a one-plus with the dry and two-plus with the moist antigen. Of 19 of the chronic cases group tested with the moist antigen 10 were positive; of 25 tested with the dry antigen 13 were positive; altogether, of 32 different patients 16, or exactly half, were positive. Twelve were tested with both antigens and, as with the first group, all but one gave the same results with both; the exception, as in the one in the first group, gave a one-plus with the dry and a two-plus with the moist antigen.

In the primary stages the W.R. may be positive without the presence of syphilis, but as the acute symptoms subside the W.R. becomes negative.

H. Harold Scott

DIAS, E. & PELLEGRINO, J. Alguns ensaios com o " Gammexane " no combate aos transmissores da doença de Chagas. [**Experiments with Gammexane against Vectors of Chagas's Disease.**] *Brasil-Medico.* 1948, May 1, 8 & 15, v. 62, Nos. 18–19–20, 185–91.

Experiments were carried out with preparations of *gamma* BHC to determine the effectiveness of this insecticide for controlling *Triatoma* (*T. infestans*) the carrier of Chagas's disease. Laboratory tests were made with dried mud or wood surfaces, the former being similar to cellars which the triatoma infest. Such surfaces rapidly absorb sprays and it was necessary to employ a preparation of *gamma* BHC which was deposited superficially. A satisfactory product was found in " Gammexane " P530 which forms aqueous suspensions. Dried mud surfaces treated with 1–2 gm. of *gamma* BHC per square metre were lethal to adults and nymphs of *T. infestans* after a minute's contact. A surface of mixed mud and straw required rather longer (5–15 minutes' contact).

Adults were more susceptible than nymphs. Tests repeated later showed that the toxicity had greatly declined after a month and even more after two months, when exposures of several hours did not always kill. *Gamma* BHC was superior to DDT in these tests.

Some practical tests were done in infested cellars. These were sprayed with *gamma* BHC and observed to note number of dead bugs appearing in subsequent periods. The final numbers alive were assessed after spraying with "Fly Tox", a pyrethrum spray which drives out the hiding bugs. Fairly good results were obtained if about 1 gm. *gamma* BHC was applied per square metre. Better results were obtained with a combined *gamma* BHC plus pyrethrum spray which secured a good initial kill.

A trial of three *gamma* BHC smoke generators (56 gm. BHC containing 10 per cent. *gamma*) in a 40-cubic metre infested cellar, were disappointing; many triatomas survived. *J. R. Busvine*

LEISHMANIASIS

PACKCHANIAN, A. A. **The Fate of *Leishmania donovani* and *Leishmania tropica* in the Reduviid Blood-Sucking Insect, *Triatoma*.** *Amer. J. Trop. Med.* 1948, July, v. 28, No. 4, 537–9, 1 fig.

"1. The flagellates of *L. donovani* and *L. tropica*, when fed to various species of *Triatoma* with defibrinated rabbit blood from ball of absorbent cotton, failed to multiply in this insect, or to survive for more than a day.

"2. It is concluded that *Triatoma* are not likely to become vectors of cutaneous and visceral leishmaniases, if and when they feed on men or animals suffering from these diseases."

FAKAÇELLI, N. M. Yeni bir kala-azar vakasi hakkinda. [**Infantile Kala Azar.**] *Türk Tip Cemiyeti Mecmuasi*. 1947, Sept., v. 13, No. 9. [In Turkish 394–7, 4 figs. English summary 56.]

A fatal case in a boy of 18 months diagnosed by spleen and marrow puncture.

FAKAÇELLI, N. M. Kala-azar hakkinda. [**A Case of Infantile Kala Azar.**] *Türk Tip Cemiyeti Mecmuasi*. 1946, May, v. 12, No. 5. [In Turkish 160–62. English summary 24–5.]

A case in a boy of 3½ in Istanbul.

BILHAN, N. Erişkinde kala-azar. [**5 Cases of Kala Azar of the Grown-Up.**] *Türk Tip Cemiyeti Mecmuasi*. 1945, Dec., v. 11, No. 12. [In Turkish 517–20. English summary 76.]

Leishmaniae were found in either bone marrow or splenic smears. Two patients died. The author suggests that kala azar is increasing in Turkey. *H. J. O'D. Burke-Gaffney*

CORKILL, N. L. **Activation of Latent Kala-Azar and Malaria by Battle Experience.** *Ann. Trop. Med. & Parasit.* 1948, Sept., v. 42, No. 2, 224–9, 1 map & 2 graphs.

A military unit ["a company", number unspecified] was recruited in June 1940 in the Nuba Mountain area of the Sudan, where leishmaniasis is very rare; the men therefore were presumably not infected with, but were susceptible to, kala azar. The unit was moved to Southern Fung, an area of high kala azar endemicity, in October, 1940; one man was there hospitalized for an undetermined condition; at post mortem 104 days later he was found to be suffering from kala azar. It is suggested that he acquired his infection in the hospital, local cases of kala azar being concurrently treated there. In

May 1941, the men were engaged in battle under arduous climatic conditions. Immediately afterwards, cases of fever due to kala azar were found among them ; their appearance bore no relation to the local seasonal peak of incidence of the disease. The unit, in November 1941, was again engaged in battle in the same place under similar conditions, and further cases of fever due to kala azar followed. The appearance of all recorded cases is depicted diagrammatically ; it would appear that the total number was 24.

The onset of relapses, or of delayed primary attacks, of malaria in European troops as a result of battle experience suggested itself as a comparable phenomenon. A study of hospital records of such cases in 1944 supported this view, and in a graph is recorded the incidence of such attacks of malaria in British troops following the invasion of Europe. The peak of incidence among these considerably antedated that of the normal seasonal relapse wave, which, in them, when it occurred was consequently largely abortive. It is suggested that the activation of both the kala azar and the malaria infections was due to increased adrenaline secretion resultant on emotional stress.

A. R. D. Adams

CORKILL, N. L. **Activation of Latent Kala-Azar by Malaria and Relapsing Fever.** *Ann. Trop. Med. & Parasit.* 1948, Sept., v. 42, No. 2, 230–35, 1 graph.

The peaks of admission to hospital of kala azar and of malaria in the Sudan, as in India and elsewhere, tend to be associated. These normally occur in the Sudan in the latter part of the year. In 1940, at Gedaref in the Sudan, an abnormal rise in the incidence of detected cases of kala azar occurred in the spring. This was found to be associated with an outbreak of relapsing fever. The rise in incidence usually taking place in the latter part of the year was largely abortive on this occasion. Data showing the reported incidence of cases of malaria, of kala azar, and of relapsing fever, and their association, are set forth in graphs.

A. R. D. Adams

FEVERS OF THE TYPHUS GROUP

JADIN, J. Le typhus exanthématique de l'Urundi. [**The Exanthematic Typhus Fever of Urundi.**] *Ann. Soc. Belge de Méd. Trop.* 1948, June 30, v. 28, No. 2, 189–212, 2 charts & 1 map.

The author and P. GIROUD have already reported that in the 1945–1946 epidemic of typhus fever in Urundi the rickettsia-agglutination reaction was of the epidemic type [see this *Bulletin*, 1948, v. 45, 592]. In the present paper a detailed study of strains of rickettsiae isolated from patients during the epidemic is described. A periorchitic reaction, occasionally severe, was often caused in guineapigs, but the results of complement-fixation and rickettsia-agglutination tests carried out on patients and inoculated animals pointed definitely to *Rickettsia prowazeki* as the cause of the epidemic. Eighteen samples of serum from patients were sent to the late Harry Plotz who reported that 13 of them gave complement-fixation reactions typical of epidemic typhus.

These findings disagree with those of NEUJEAN who maintained that the previous epidemics in the same region in 1933–34 and 1939–40 were caused by murine rickettsiae [*ibid*, 1946, v. 43, 324].

[The scanty information supplied with regard to the epidemiological and clinical features of the epidemics points rather strongly to louse-borne infection.

Many of the recent observers of the typhus fevers have tended to ignore the evidence that can be obtained by a study of the epidemiological conditions associated with outbreaks.] *John W. D. Megaw*

RIVOALEN, A. Considérations épidémiologiques et biologiques à propos d'une épidémie de typhus au Tonkin (1944). [**Epidemiological and Biological Considerations connected with an Epidemic of Typhus Fever at Tonking (1944).**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 329–33.

Two exceptionally large epidemics of typhus fever in Indo-China are described. Between August 1943, and March 1944, there were 352 cases in South Annam ; the mortality rate was 17·6 per cent. Between February and June 1944, 726 cases were admitted to a hospital in Tonking ; it was estimated that between four and five thousand cases occurred in Hanoi and its suburbs, and tens of thousands in the delta.

Rickettsiae isolated in the South Annam epidemic caused a slight scrotal reaction in three out of fifty inoculated guineapigs.

The mortality rate in the Tonking hospital was 16·6 per cent. in February, but it gradually fell and was only 6·9 per cent. in June. Scrotal reactions are said to have occurred rather frequently ("*assez fréquemment*") among the guineapigs inoculated at the Hanoi Pasteur Institute.

Detailed laboratory studies were impossible at the time, but three years later the serum of a former patient (the author himself) was found by Giroud to have more active antibodies against epidemic than against murine typhus when tested by the rabbit dermal reaction.

In the discussion following the reading of the paper, GIROUD reiterated his opinion that it is difficult to differentiate epidemic typhus from murine typhus by animal inoculation ; he mentioned his own experience of finding that epidemic rickettsiae sometimes caused scrotal reactions and that murine rickettsiae might, or might not, be fatal to mice.

[There seems to be little doubt that the epidemics were of louse-borne typhus. The author considers the fatality rate to have been lower than would have been expected in epidemic typhus, especially as only the more severe cases were likely to have been sent to hospital ; but the louse-borne disease tends to be less virulent in hot climates, where for some reason transmission of infection does not readily occur.] *John W. D. Megaw*

EVANS, A. S. **Observations on Typhus in Okayama, Japan.** *Bull. U.S. Army Med. Dept.* 1948, Sept., v. 8, No. 9, 733–41, 2 figs. [22 refs.]

Between February and July 1946, 184 cases of typhus fever were reported in Okayama Prefecture. The outbreak was part of a widespread epidemic of louse-borne typhus in Japan and Korea during "the latter part of 1945 and extending through the first six months of 1946". It was estimated that 30,000 cases had occurred and that the case fatality rate had been 6–10 per cent. in the epidemic as a whole.

Murine typhus is believed to be endemic in Okayama, and the local physicians classed 56 of the 184 cases as murine on clinical and epidemiological evidence which the author regards as quite unreliable. The information obtained in connexion with the louse-borne cases points to a close resemblance between the disease and the epidemics occurring in other parts of the world.

John W. D. Megaw

Perez Gallardo, F. & Fox, J. P. **Infection and Immunization of Laboratory Animals with *Rickettsia prowazekii* of Reduced Pathogenicity, Strain E.** *Amer. J. Hyg.* 1948, July, v. 48, No. 1, 6–21. [29 refs.]

This is a study of strain E (E for *Espanha*) of *Rickettsia prowazeki* isolated in Madrid in 1941 by Clavero and Gallardo and found to be of persistently low virulence to man and animals while being of good potency as an immunizing agent [see this *Bulletin*, 1944, v. 41, 24 and 1945, v. 42, 794].

The strain has now been maintained through 255 egg passages and taken to New York for the further studies described in the present paper.

The strain has been found less pathogenic than other epidemic strains for mice, eastern cotton rats, rabbits and guineapigs ; it could not be established in guineapigs but has been maintained without any change in pathogenicity through 11 passages in cotton rats ; it has also been passaged once or twice through lice.

The immunity caused in animals by inoculation with the strain was weaker than that caused by other strains of *R. prowazeki*, but was enough to protect cotton rats and guineapigs against relatively large challenge doses of virulent epidemic and murine rickettsiae.

Sera of infected guineapigs fixed complement at titres lower than those observed after infection with other strains, and it was found that the titres of the reaction varied according to the size of the infecting dose of rickettsiae, whereas a variation of this kind is not observed with virulent strains.

The value of the strain as a living vaccine for human beings remains to be tested, but trials are regarded as justified in view of the existence of a potent therapeutic agent, para-aminobenzoic acid. *John W. D. Megaw*

Giroud, P. & Jezierski, A. Pouvoir toxique das rickettsies du typhus épidémique ou murin provenant de passages pulmonaires. Différenciation des souches. [**The Potency of the Toxins of Epidemic and Murine Typhus Rickettsiae obtained by Passage through Lungs. Differentiation of Strains.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 336–8.

The experiments described were devised with a view to finding whether the toxicity of epidemic-typhus rickettsiae would be modified by repeated passages through lungs.

Comparison was made between epidemic rickettsiae which had been maintained by rabbit-lung passage for six years and a strain of murine rickettsiae of which no details are given except that it was of pulmonary origin.

Injections of rickettsial suspensions were given, by the intraperitoneal, intravenous and intracerebral routes, to white mice of which 250 were used. The intravenous route was found most suitable for estimating the toxicity of the strains, but by all three routes the epidemic strain was less toxic than the murine. By the cerebral route, the murine strain caused paralysis in mice, whereas the epidemic strain caused no manifestations of this kind.

John W. D. Megaw

Liu, Wei-t'ung, Chang, Hwei-ching & Wang, Pe'i-jen. **Frequency, Concentration and Behavior of *Proteus vulgaris OX19* Agglutinin and Complement Fixing Antibody for *Rickettsia prowazeki* in Typhus and Non-Typhus Febrile Patients and in Normal and Vaccinated Persons.** *Chinese Med. J.* Shanghai. 1948, Apr., v. 66, No. 4, 177–94. [25 refs.]

This paper contains an account of a detailed study of the Weil-Felix and complement-fixation reactions observed in 33 cases of louse-borne typhus in

Lanchow, China. High, or moderately high, titres were reached with both tests in 72·7 per cent. of the cases : such titres were reached with the Weil-Felix test alone in 9·1 per cent. and with the complement-fixation alone in 18·2 per cent. of the cases. The time of appearance of the antibodies was variable ; sometimes one of the tests became positive first, sometimes the other. In some cases the earliest positive result with either test was delayed till the 12th or even the 14th day.

Among bacteriologically proved cases of enteric fever in Peiping, the Weil-Felix test became strongly positive in two, and a mixed infection was suspected ; a rise of the titre to 1–80 or 1–160 was observed in 10 other cases.

Among 67 cases of fevers other than typhus, 10 showed a rise in titre with the Weil-Felix or complement-fixation test ; in two of these both reactions became strongly positive and a dual infection was suspected ; in one the Weil-Felix reaction was positive 1–80, and there was no rise in the complement fixation titre ; in the remaining seven cases the fixation titre rose to 1–8 to 1–64 and there was no rise in the Weil-Felix titre.

The authors suggest that " a small rise in titre of either antibody itself does not constitute a diagnostic criterion " but should be evaluated in correlation with the clinical evidence. *John W. D. Megaw*

D'Ignazio, C. & Codeleoncini, E. La reazione di Weigl nella diagnosi precoce e precocissima del tifo esantematico. [**The Weigl Reaction in the Early and Earliest Diagnosis of Typhus Exanthematicus.**] *Acta Med. Italica.* 1948, Aug., v. 3, No. 8, 208–12, 1 chart. English summary (7 lines).

The authors claim to be able to make a very early diagnosis of typhus fever by employing Weigl's micro-agglutination reaction in which suspensions of *Rickettsia prowazeki* are used. The special features of their technique are the employment of very low dilutions and the repetition of the test every four hours. The series of dilutions starts at 1–3 and rises by slow degrees to 1–6 ; 1–9 ; 1–12, etc.

Among 13 patients tested on the first day there were already five positive reactions at a titre of 1–3 ; among 27 tested on the second day there were 18 positives, including one at a titre of 1–18 ; five at 1–12, and seven at 1–9.

The reaction is said to become positive one to one and a half days earlier than the Weil-Felix test, but in the latter the lowest dilution employed was 1–20 so that the conditions were not comparable. The special interest of the study is that it suggests the possibility of detecting the earliest rise in the agglutination titres by repeated tests with low dilutions of the sera.

John W. D. Megaw

Baltazard, M. & Bahmanyar, M. Présence du virus du typhus murin chez les rats des ports d'Abadan et Bender-Bouchir (Golfe Persique). [**Murine-Typhus Infection among the Rats of the Ports of Abadan and Bander-Bouchir (Persian Gulf).**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 334–5.

At Abadan in South Iran the authors trapped 49 rats of which 19 were *Rattus norvegicus*, 13 were *R. alexandrinus*, and 17 were *R. frugivorus*. An orchitic strain of rickettsia was isolated from a pool of three *R. norvegicus*, and another strain from a pool of three *R. alexandrinus*.

At Bouchir 66 *R. frugivorus* and 6 *R. norvegicus* were caught ; *R. alexandrinus* was absent. An orchitic strain was isolated from a pool of four *R. norvegicus*. No infection was found among rats of the species *R. frugivorus*, the indigenous

rat of South Iran, and the authors suggest that murine typhus is likely to occur only in the seaports of the country where there is a floating ("*navigante*") population of rats of the other species.

There was complete cross-immunity between the three strains and also between them and a murine strain from Casablanca. *John W. D. Megaw*

STOKER, M. G. P. **The Incidence of Murine Typhus amongst Wild Rodents in Poona and Bombay.** *Indian J. Med. Res.* 1948, Jan., v. 36, No. 1, 15–25. [12 refs.]

Three strains of rickettsiae, of which the author states that "it seems probable that they were all strains of murine rickettsiae", were isolated at Poona between June and August, 1946. One strain was from a pool of seven brains of *Rattus rattus*, another was from a pool of brains of three bandicoots (*Bandicota malabarica*), and the third was from a pool of 142 fleas of various species collected from 104 rats, ten of which gave positive complement-fixation reactions with murine-typhus antigen.

Only one of the rats making up the above pool of seven gave a complement-fixation reaction, and none of the bandicoots in the pool of three reacted.

Several other experiments are described in which negative results followed attempts to isolate rickettsiae from rats, from fleas collected from rats and bandicoots, and from a pool of 91 mites from rats and bandicoots.

Sera of 338 rats were tested by the complement-fixation reaction against murine antigen; 32 (9·58 per cent.) reacted at titres of 1–10 or over.

Sera of 42 bandicoots were tested in the same way; three (7·1 per cent.) reacted. Only one out of ten sera which gave positive complement-fixation reactions agglutinated *Proteus OX19*, and none agglutinated murine rickettsiae.

Among 77 rats trapped in Bombay, the percentage of positive complement-fixation reactions was 9·3, and a strain of murine rickettsiae has already been isolated from a rat in Bombay [this *Bulletin*, 1948, v. 45, 1077].

Sera of 74 rats and 17 bandicoots from Poona were tested for complement-fixing antibodies against Rocky Mountain spotted fever antigen; the results were negative in every case. *John W. D. Megaw*

KE, Fu-hung, CHANG, Hwei-ching & LIU, Wei-t'ung. **A Rat and Flea Study in Lanchow with particular reference to Typhus Infection.** *Chinese Med. J.* 1948, May, v. 66, No. 5, 247–51. [22 refs.]

"During a period of one year from July 1, 1945 to June 30, 1946, a total of 333 house rats, *Rattus norvegicus*, and 705 fleas, *Ceratophyllus anisus*, were examined in Lanchow. Of 121 guinea pigs inoculated with pooled brain emulsions from 310 rats and 30 guinea pigs with pooled suspensions of a total of 523 fleas, none showed any evidence of typhus infection. It is suggested that murine typhus either does not exist in this locality, or if so, only rarely."

NICHOLSON, H. P., GAINES, T. B., MCWILLIAMS, J. G. & VETTER, M. H. **Combined Typhus-Malaria Control Residual Spray Operations with Five Percent DDT Emulsion.** *Pub. Health Rep.* Wash. 1948, July 30, v. 63, No. 31, 1005–13, 7 figs.

The occupants of premises are frequently annoyed at the patches of white powder left on their floors after the application of DDT dust during murine typhus control operations. It was therefore decided to test residual spraying with a water emulsion of DDT for the control of rat ectoparasites.

A suitable area was found in Lowndes County, Georgia, where 25 farms were selected for treatment and 15 other farms were used as checks. A preliminary survey showed that rats and ectoparasites were present in significant numbers. A power sprayer and pressure hand sprayers were used to apply 5 per cent. DDT emulsion at approximately 200 mgm. DDT per square foot. Rat burrows and harbourages received rather heavier treatment. In houses, the walls and ceilings and a two-foot strip of floor adjoining the walls were treated. In outbuildings, the treatment was the same except that the whole floor was done when possible. Each farm required on the average 3·9 man-hours of labour and 0·3 gallons of emulsion. The results are tabulated and graphed.

Leptopsylla segnis was successfully controlled and an initially small number of *Xenopsylla cheopis* was prevented from developing. The percentage of rats bearing fleas was substantially reduced. The period of effective residual control lasted from 4 to 6 months.

There were seven species of mites on the rats, of which 98·7 per cent. were *Liponyssus bacoti*. Control of this mite was successful, though its duration could not be accurately determined because of the normal seasonal reduction which intervened.

No significant reduction was observed in the numbers of the louse *Polyplax spinulosa*.

Though the emulsion gave such satisfactory immediate and residual control of rat fleas, the cost in money and labour compared unfavourably with expenditure incurred in the spraying programme for malaria control (0·96 man-hour) and with the DDT dusting programme for murine typhus control (0·26 man-hour). Therefore the authors suggest the trial of a combined spraying and dusting technique for the control of both mosquitoes and rat ectoparasites which should be more economical and less objectionable to occupants of treated premises. Spraying could be used for walls, ceilings and the narrow strip of floor, while dusting could be reserved, with certain exceptions (*e.g.* where dust would be objectionable or a hazard to livestock) for attics, spaces between walls and the outbuildings. *H. S. Leeson*

Giroud, P. Au sujet du tsutsugamushi, sensibilité de la gerbille, réactions cutanées, antigènes. [**Tsutsugamushi Disease, Susceptibility of the Gerbille; Cutaneous Reactions; Antigens.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 338–41.

Like other workers, the author found the rickettsiae of scrub typhus poorly supplied with antigens; hence the difficulty of obtaining a potent vaccine. This poverty is believed to be associated with the lack of the substance which takes on the red colour in preparations stained with Macchiavello's stain. The rickettsiae of the other typhus fevers are "fuchsinophile", whereas those of scrub typhus are not. *John W. D. Megaw*

Smadel, J. E., Woodward, T. E., Ley, H. L., Jr., Philip, C. B., Traub, R., Lewthwaite, R. & Savoor, S. R. **Chloromycetin in the Treatment of Scrub Typhus.** *Science.* 1948, Aug. 13, 160–61, 2 figs.

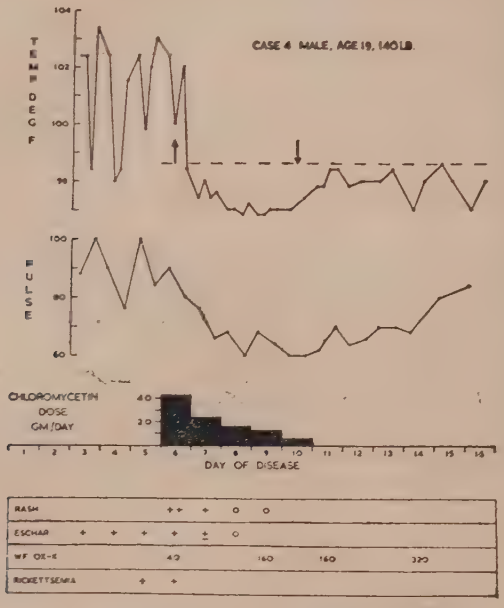
Smadel *et al.* have already obtained promising results in the treatment of epidemic typhus by the use of chloromycetin [see this *Bulletin*, 1948, v. 45, 1077].

The present paper consists of a brief résumé of the results observed in 25 proved cases of scrub typhus treated by the same drug at Kuala Lumpur, Malaya. Twelve comparable cases occurring in the same area and at about the same time served as controls.

The treatment was started on the 3rd to the 11th day of the fever (average 6·2 days). The duration of the fever after treatment was started was 10 to 96 hours (average 31 hours). The treated patients were discharged from hospital 9 to 28 days (average 19·2) after the onset of the illness the control patients were discharged 17 to 53 days after the onset (average 30·7 days).

There was no death and no complication among the treated; one of the control patients died and two had complications, parotitis and pneumonia, respectively.

The remarkable response usually shown to the drug is shown by the chart of a typical case.



Typical response of patient with scrub typhus following treatment with chloromycetin.
[Reproduced from *Science*.]

In the earlier cases, the treatment was on the lines recommended in the previous paper but the course was gradually shortened and the last seven patients received the drug for only 24 hours, during which time a total quantity of about 6·0 gm. was given. *John W. D. Megaw*

Slot, G. A. Para-aminobenzoëzuur in de behandeling van scrubtyphus (Mijtekoorts). [**Para-aminobenzoic Acid in the Treatment of Scrub Typhus.**] *Med. Maandblad*. 1948, Aug. 1, No. 25, 509–11.

A discussion and account of a case.

Caminopetros, J. P. La "Q" Fever en Grèce. Le lait, source de l'infection pour l'homme et les animaux. [**Q Fever in Greece. Milk as a Source of Infection for Man and Animals.**] *Ann. Parasit. Humaine et Comparée*. 1948, v. 23, Nos. 1/2, 107–18.

The author has made a close study of the disease since 1943 when he first isolated rickettsiae from the blood and sputum of patients in Greece by guinea-pig inoculation. Seven strains were isolated from the blood and five from the

sputum of German soldiers. One of these strains was maintained through 20 guineapig passages over a period of 15 months, and was identified early in 1945 in America as *Rickettsia burneti* by DINGLE to whom the strain was submitted.

In the further studies described in the present paper, complement-fixation tests revealed the occurrence of inapparent infection among physicians and other persons who had come into close contact with patients, and also the occurrence of infection among goats in Greece and Asia Minor.

Kids and lambs were experimentally infected by nasal instillation or subcutaneous inoculation of infected blood ; after an incubation period of 6–10 days there was a febrile attack lasting 7–12 days, and the blood of the animals was found infective during the whole febrile period.

Horses and mules were found to be highly susceptible to subcutaneous inoculation ; dogs were somewhat susceptible, but cats were resistant.

Goats and sheep, inoculated by the nasal route with the blood of infected guineapigs, developed severe attacks in which bronchopneumonia was a pronounced feature. The milk of infected goats remained infective throughout the rest of the period of lactation and samples kept in the refrigerator remained virulent for at least three months.

In Athens the milk of a flock of 16 Maltese goats was examined in pools, and it was found that at least four of the animals were infected. Other flocks of goats yielded similar results.

Nine new-born kids and five new-born lambs of infected mothers were found free from infection at birth, but 8–10 days later they had febrile attacks and *R. burneti* was isolated from their blood. The above observations are regarded as showing that milk is the source of natural infection among animals and that it " must be also the source of human infection." The author states that although transmission in man can occur by the inhalation of particles of sputum, this does not appear to be the chief natural mode of spread of infection, because the seasonal arrest of the disease in summer is correlated with the cessation of lactation among goats and sheep.

The author seems to suggest that the mechanism of transmission by milk is through direct contact of the milk with the upper air passages ; he states that this mechanism would help to explain the special involvement of the respiratory system in man and lower animals.

[In their study of 117 cases of the disease in Southern California HUEBNER *et al.* found no evidence that infection was transmitted to man by drinking milk, though they thought it possible that milk might be a source of infection by some mode not yet determined (see this *Bulletin*, 1948, v. 45, 509).]

John W. D. Megaw

CAMINOPETROS, J. Le lait, source de contamination de l'homme et des animaux dans la transmission de la fièvre du Queensland observée en Grèce. [**Milk, the Source of Q Fever Infection of Man and Animals in Greece.**] *Bull. Acad. Nat. Méd.* 1948, v. 132, Nos. 25/26, 468–71.

This is an abbreviated version of the paper dealt with above.

IMHÄUSER, K. Untersuchungen über den Erreger der " Viruspneumonie." [**On the Aetiology of " Viruspneumonia."**] *Klin. Woch.* 1948, June 1, v. 26, Nos. 21/22, 337–9. [15 refs.]

The paper recounts experiments on guineapigs and rabbits inoculated with sputum from cases of epidemic bronchopneumonia seen in Greece and South-East Europe in 1941 and 1944.

The experimental disease produced in animals is described in detail. The author himself was not able to carry the work far enough to identify the virus, but he states that HERZBERG isolated from experimentally infected animals a rickettsia-like agent in eggs [chorioallantoic membrane], and that the workers of the American Commission on Acute Respiratory Diseases were able to identify his strain of virus as *Rickettsia burneti*, similar to strains they found associated with like disease.

The occurrence of Q fever pneumonia is discussed, and a warning uttered against labelling all atypical pneumonia as such, since other viruses have been shown to be implicated as well. *E. T. C. Spooner*

DENGUE AND ALLIED FEVERS

MENJAUD, J. Note sur l'épidémie de dengue observée à Diego-Suarez, en mars-avril, 1947. [**An Epidemic of Dengue at Diego-Suarez in March-April, 1947.**] *Rev. Méd. Nav. (Métropole et Outre-Mer)*. Paris, 1947, v. 2, No. 3, 215–20.

This note describes an epidemic of dengue which occurred among members of the French Navy at the end of a hot, rainy season in Diego-Suarez, Madagascar, in 1947. Only Europeans were affected and particularly new arrivals: no clear cases were recorded among the native population. In all, 37 out of 150 members of the Forces and 41 of 152 civilian workers were attacked: this constituted about one-quarter of the Europeans at risk.

A detailed symptomatology is given, from which it is apparent that the course of the disease was characteristic. The rash was seen in about half the cases. A typical leucopenia and relative lymphocytosis were constant: five examples of blood counts are shown. The diagnosis was made, as is usual, from the characteristic symptoms and by exclusion of other fevers. The only complications noted were those affecting the eyes, occasional conjunctivitis or simple inflammation and, in one case each, phlyctenular conjunctivitis and iritis. All patients recovered uneventfully. It is noted that the season had been unusually rainy (49 mm. in 2 hours on January 29th and 123 mm. in 4 hours on April 3rd are quoted as examples). Local conditions favoured the breeding of *Aëdes* mosquitoes, which are always prevalent at Diego-Suarez and constitute about 80 per cent. of the mosquitoes seen there.

Vigorous anti-mosquito measures were taken and the author considers that these should be established permanently because not only is malaria endemic in that region but the possibility of the introduction of yellow fever, especially by air, has to be borne in mind, since all the factors favourable to its dissemination appear to be present on the coast of Madagascar. [The author states that dengue does not seem to have been reported as being frequent or endemic in Madagascar up to now and that he has found no reference to it in the records. However, CULLINAN [this *Bulletin*, 1946, v. 43, 783] has observed that during the late war, dengue was particularly common among British troops in Diego-Suarez and that 94·2 per cent. of all cases in the East African Command occurred there during the first five months of 1944: Europeans were attacked eight times as frequently as Africans, and clinically the disease was remarkably similar to sandfly fever.] *H. J. O'D. Burke-Gaffney*

PLAGUE

DAVIS, D. H. S. **Sylvatic Plague in South Africa : History of Plague in Man, 1919–43.** *Ann. Trop. Med. & Parasit.* 1948, Sept., v. 42, No. 2, 207–17, 5 figs. & 1 diagram.

This paper is the first part of a study of human plague of sylvatic origin in the Union of South Africa. It describes the spread of the disease from 1919 to 1943 ; the next paper will deal with the ecological factors concerned in the spread. Until 1912, plague was of domestic rodent origin and occurred solely in towns. Then followed a series of outbreaks on remote farms in the Cape Midlands which were proved to be of sylvatic origin. Farm workers were the chief sufferers ; they contract the disease in huts and outbuildings where the domestic rodents have become secondarily infected from the gerbils. The gerbils (*Tatera brantsii* and *schinzi* in the high veld and *Desmodillus auricularis* in the karoo) form the chief primary reservoir ; these animals infect the semi-domestic *Mastomys coucha*, which infects in its turn either man directly or man *via* the intermediary of the domestic *Rattus*. If the chain of infection reached urban areas, serious epidemics might be expected but curiously enough have rarely actually occurred. Instead, there have been over 900 outbreaks in rural areas which have usually been the pointer to the existence of preceding epizootics amongst the wild rodents. There were two major epidemic periods, (1) between 1923 and 1925 and (2) between 1934 and 1936, with the incidence rising to smaller peaks every 5–6 years. The initial foci were in the North Western Orange Free State, in the Cape Midlands, in the Southern Transvaal (near Johannesburg) and in the Uitenhage District. Between 1925 and 1931 there was a westerly expansion throughout the karoo and the Kalahari Desert which carried the infection into South-West Africa and Bechuanaland. During the next six years (up to 1937) epidemics occurred throughout the Orange Free State and infection spread into Angola, Basutoland and into the Rhodesias. As far as the Union was concerned, enzootic plague had reached its limits by 1937, and the situation has remained static except for three hyperenzootic areas—Northern Orange Free State, a small focus in the Cape Midlands and in Uitenhage. Sylvatic plague flourishes today among the burrowing rodents of the rolling semi-desert country ; it is absent in North Eastern Transvaal, Natal and the coastal and low-lying parts of the Cape Province. *P. C. C. Garnham*

BUXTON, P. A. **Experiments with Mice and Fleas. I. The Baby Mouse.** *Parasitology.* 1948, July, v. 39, Nos. 1/2, 119–24, 2 figs.

During investigations into the feeding habits of the flea *Xenopsylla cheopis*, it was frequently observed that adult mice, when used as hosts in laboratory experiments and in stock cultures, ate a number of the fleas. When baby mice were used, however, it was found that the fleas were not eaten. A study was therefore undertaken of the baby mouse as a host of *X. cheopis* ; and in this paper the author gives an account of experiments which he made between 1937 and 1939.

The experimental technique is fully described and the resulting data are tabulated and graphed. At the beginning of each experiment, all fleas were unfed and under 24 hours old ; and as the baby mice could not be fed they were changed every 24 hours.

Preliminary work showed that the fleas fed equally well on very young mice and on those 10 days old, and gave no support to the idea that a baby mouse might be a bad host because it was cold. It was also noted that when fed on

adult mice, kept at 30°C., fleas started to lay eggs after a delay of 1 day, and that though the daily production of eggs was unknown, the adult offspring per female per day was about seven.

Among fleas kept at a constant temperature and humidity (22° or 30°C. and 80 per cent. R.H.), for as long as 14 days, on baby mice of various ages up to 9 or 10 days old, there was almost no mortality, but egg-laying started later (as much as 3 or 4 days), egg production was lower and adult progeny emerged later than was the case among fleas kept on an adult mouse under similar conditions. When fleas were allowed one initial feed on an adult mouse before being transferred to baby mice, they continued for at least 18 days to lay more eggs than fleas which had fed only on baby mice.

Experiments at higher temperatures (32° and 34°C.) showed that parent fleas survived better on the baby than on the adult mouse and the adult mouse consistently killed more fleas. The number of progeny was lower and the individual fleas were smaller. At 34°C. there was no progeny either of adults or cocoons.

It is obvious that fleas fed on baby mice alone lack something, and this deficiency is greater the younger the mouse. The deficiency is apparently not in nutrition, but more probably due to lack of a mammalian sex hormone. This point will be investigated. *H. S. Leeson*

SHARIF, M. **The Water Relations of the Larva of** *Xenopsylla cheopis* **(Siphonaptera).** *Parasitology*. 1948, July, v. 39, Nos. 1/2, 148–55. [19 refs.]

The experiments described in this paper were designed in an attempt to discover how water is gained by the growing flea larva.

A quantitative study was made of the development of the larvae of *Xenopsylla cheopis* and statistical methods were applied to the experimental data to ascertain if certain aspects of biology varied when the larvae were reared under different conditions of moisture content both of food and of air. The criteria adopted were : the duration of the active larval life and of the combined larval and pupal life of both sexes ; the mortality rate in different active larval instars and the period in which they died ; the proportion of resting larvae that failed to pupate and the proportion of success in the rearing of adults and the disparity in their sex ratio.

At the commencement of each experiment the larvae were unfed and less than twenty-four hours old. They were put into small specimen tubes and kept at a constant temperature of 22°C., which is suitable for successful development, and at a relative humidity of 60 per cent., which is low enough to magnify any differences under experimental conditions. The larval food was a mixture of blood and yeast, which had been dried over concentrated sulphuric acid for three to five days or for fifteen days before being used. In some experiments the quantity of food was sufficient to cover the larvae (2 gm.) making a layer 3/16 in. deep ; in these tubes, larvae burrowed through the food to the bottom even though conditions there were less favourable than on the surface. In other tubes, the amount of food was not enough to cover the larvae even if they tried to burrow. Some experiments were run in which the food, both shallow and deep, was unchanged, and in others the food was changed either once or twice a day. Control experiments were made with deep food, mixed with sand, which had previously been brought into equilibrium by exposure to 60 per cent. relative humidity at 22°C. The course of each experiment is described in detail and the results are summarized in two continuous tables. These show that, in the control experiments, 100 per cent. of the larvae completed their active larval life, 96·5 per cent. spun individual cocoons, and 96 per cent. of them emerged successfully. The proportion of the emerged adults

was significantly higher and their average combined larval and pupal life was significantly shorter than when they were reared in a large quantity of unchanged dry food, or in a small quantity of dry food whether changed or not. All the larvae died in the first instar, within seventeen days, when kept in a large quantity of dry food changed once or twice a day.

It is thus proved by controlling the quantity of dry food and its moisture content and the duration of its exposure to 60 per cent. relative humidity at 22°C., that the chief source of the gain of water in the larva of *X. cheopis* is through its food. *H. S. Leeson*

INDIAN MED. GAZ. 1948, Mar., v. 83, No. 3, 137–43. [30 refs.] **Plague in Calcutta.**

This editorial article, by Lt.-Col. GREVAL, I.M.S. (ret.) is a suitable introduction to the following six papers dealing with the reappearance of plague in Calcutta which had remained free from indigenous cases of the disease since 1926.

The article will be of special interest to historians of plague in India. Several extracts are given from editorial articles in the *Gazette* during the early years of the original invasion of Calcutta and Bombay by the disease from 1895 onwards; these articles were by Dr. W. J. SIMPSON who wrote with special authority because he was also Health Officer of Calcutta at the time. The yearly incidence of the disease in the two cities up to 1925 is also given.

There is a brief reference to the dramatic murder committed on the crowded platform of the chief railway terminus of Calcutta in 1933. This was by the injection, presumably by a hypodermic syringe, of a culture of plague bacilli into the victim who was the half-brother of the originator of the crime. The culture had been obtained from a bacteriological laboratory in Bombay by a medical man who posed as a research worker interested in testing the efficacy of a treatment of the disease and who was duly sentenced to death at the same time as the chief conspirator. For some reason the sentences were commuted to long terms of imprisonment, but the wicked half-brother after his release met a violent death during the civil disturbances of 1947.

The present outbreak is described as having lasted from March 6 to May 25, 1948 and as consisting of not more than 147 cases with 30 deaths, but a final note dated June 28 contains the information that no further cases have been reported since June 2nd 1948.

The antedating of the present issue of the *Gazette* by at least three months is likely to puzzle readers who find that events of April, May, and June are described in articles whose date of publication is stated as being March of the same year. *John W. D. Megaw*

LAL, R. B. & SEAL, S. C. **An Interim Note on certain Features of the Outbreak of Plague in Calcutta during March–May 1948 (corrected up to 10th May).** *Indian Med. Gaz.* 1948, Mar., v. 83, No. 3, 145–8.

The authors describe an epidemiological study carried out between April 17 and May 10 1948, into the outbreak of plague in Calcutta.

Eleven cases, of which eight were fatal, had already occurred, but none had been recognized as plague till the commencement of the enquiry. From April 29 the number of cases rapidly increased so that during the next two weeks 105 had been reported, and by May 10 the total number of confirmed

cases was 147. The case-fatality rate was 11·5 per cent., most of the later cases having been very mild. There were 64 other cases in which plague was suspected but excluded. Only three of the 35 wards and suburban areas of the city remained free from the disease, but the number of cases exceeded 10 in only five of these areas. Surprisingly, 134 of the cases occurred singly; three houses had two cases each, one house had three cases, and one had four.

The wide and rapid spread of infection is shown by the fact that between the 16th and 31st April first cases were reported from 27 of the 35 areas mentioned above.

Bacteriological examination of 891 rats, trapped in 25 areas, was carried out between April 20 and May 10; five strains of infection were isolated from 19 rats, of which seven were *Rattus rattus* and 12 were *R. norvegicus*. The heaviest rate of infection of rats was in the ward of the city in which the first case and the largest number of cases occurred, but one or more infected rats were trapped in 10 other areas. Infection doubtless existed in many other areas because in only nine of the 35 areas did the number of rats trapped exceed 20, so that the survey was admittedly inadequate.

The flea and *X. cheopis* indexes, based on the examination of a limited number of rats, were as follows :—

	Flea index	*X. cheopis* index
April 19 ...	2·5	2·5
,, 24 ...	11·5	4·0
,, 29 ...	5·7	2·9
May 10 ...	"Between 1·0 and 1·5"	

The authors hesitate to express an opinion as to whether the outbreak "heralds the beginning of a pandemic," but they find some indications that it may do so and they rightly insist that the situation ought to be handled on the assumption that the history of the previous visitation may repeat itself. They point out that Dr. Simpson, Health Officer of Calcutta, diagnosed a case of plague in 1895, and that his warning of the danger was ignored.

John W. D. Megaw

Roy, D. N. **A Note on Fleas and Rats with reference to Plague in Calcutta.** *Indian Med. Gaz.* 1948, Mar., v. 83, No. 3, 149–50.

A concise description is given of the bionomics of rats and fleas in India, with special reference to the transmission of plague.

Mention is made of two previous surveys of the incidence of rat fleas in Calcutta. The first was by Strickland and the author in 1930 [this *Bulletin*, 1930, v. 27, 731] when "a low flea index" was observed; the second was by Rao in 1941 [*ibid*, 1941, v. 38, 620] when the index was 9·0 for *Rattus norvegicus* and 4·3 for *R. rattus*.

John W. D. Megaw

Panja, G. & Gupta, S. K. **A Note on the Investigation of Suspected Plague Cases in the Campbell Hospital, Calcutta.** *Indian Med. Gaz.* 1948, Mar., v. 83, No. 3, 148–9.

From April 16 onwards, 77 cases were investigated by the authors at the Campbell Hospital; *Pasteurella pestis* was isolated from eight of the patients

by gland puncture, but only one yielded a positive blood culture. All of the successful isolations were effected during the first few days of the investigation when only severe attacks were occurring.

Slide agglutination tests are said to have been very useful in identifying cultures of the organism and in the serological examination of the patients.

Sera of all the bacteriologically-positive patients who survived long enough contained agglutinins (titres 1–20 to 1–320) against recently isolated strains of *P. pestis* by the 7th to the 10th day of the illness. There was a positive reaction in only three of the bacteriologically-negative cases. Freshly prepared suspensions of 24-hour agar cultures were employed, and the reading of the slide test was made after one minute.

The large number of negative results is attributed to the mildness of the attacks and the use of sulphonamide drugs. *John W. D. Megaw*

Gupta, A. K. D. **A Short Note on Plague Cases treated in Campbell Hospital.** *Indian Med. Gaz.* 1948, Mar., v. 83, No. 3, 150–51.

Most of the patients attacked during the epidemic in Calcutta were treated at the Campbell Hospital where 129 [since corrected to 132] were dealt with up to May 25, 1948.

Between May 7 and May 25 severe cases predominated, and for the whole epidemic the bacteriologically positive cases numbered 21; all of these were positive with gland puncture and 13 were positive also with blood culture. Fourteen cases were classed as septicaemic, the rest as bubonic.

Three different lines of treatment were adopted (1): streptomycin injections; 24 of the severest cases were treated and there were seven deaths [since corrected to 4]. (2) sulphadiazine by mouth, and (3) sulphamethazine; an initial dose intravenously, then four tablets every four hours. Among the 108 cases treated by sulphonamide drugs there were 11 deaths, but in the conditions prevailing it was not possible to express an opinion regarding the relative value of the different lines of treatment. *John W. D. Megaw*

Ahmad, M. U. **Recent Outbreak of Plague in Calcutta.** *Indian Med. Gaz.* 1948, Mar., v. 83, No. 3, 156.

This is a brief note by the Health Officer of Calcutta who states that the control measures adopted were the isolation and treatment of patients in hospital, disinfestation with DDT, epidemiological investigation and examination of rats under the supervision of the All-India Institute of Hygiene and Public Health, and mass inoculation.

Patel, T. B. & Rebello, J. L. **An Assessment of the Value of Plague Vaccine (Haffkine Institute) as used in a Single Dose Mass Inoculation. (A Field Enquiry.)** *Indian Med. Gaz.* 1948, Mar., v. 83, No. 3, 151–5.

An attempt was made to assess the value of single doses of plague vaccine (2·0 cc.) recently obtained from the Haffkine Institute, Bombay.

The enquiry was made after the subsidence of the epidemic; it dealt with 3,320 infected houses in 120 villages and seven municipalities. Despite the limitations of an enquiry held without previous planning the authors consider that certain broad conclusions can safely be drawn from their findings. The information collected has been analysed from several points of view, but the

general results observed among persons exposed to risk can be gathered from the following table which deals with the inmates of houses in which a case occurred or in which a rat-fall had been noticed.

	Number	Attacks	Attack rate per cent.	Deaths	Death rate per cent.	Case fatality rate per cent.		
						Total	Sulpha treated	Untreated
Inoculated at risk ...	7,660	944	12·3	185	2·4	19·5	15·3	38·4
Uninoculated at risk ...	4,241	1,382	32·5	652	15·3	47·1	35·5	61·7

Among the "uninoculated at risk" were included those who had been inoculated less than seven days before the attack.

There was no significant increase in the case-fatality rate among those who had been inoculated during the three days preceding the onset, and it appeared that adequate immunity had become established about seven days after the inoculation. The lowest case-fatality rate observed (18·5 per cent.) was among persons who had been inoculated 16–30 days before the onset of the attack; the highest rate, as would be expected, was among those inoculated less than three days before the onset, this was 48·7 per cent. as compared with 47·1 per cent. for the uninoculated as a whole. *John W. D. Megaw*

CHOLERA

GOHAR, M. A. & MAKKAWI, M. **Experimental Infection of Animals with the Cholera Vibrio.** *J. Roy. Egyptian Med. Ass.* 1948, July, v. 31, No. 7, 599–605, 10 figs. on 5 pls. [12 refs.]

Attempts made to infect cats with *V. cholerae* by the oral route failed when adult cats were used, except in two instances. One cat, receiving the massive dose of 500,000 million vibrios died in 36 hours, showing a distended gall bladder and congestion of the small intestine, kidneys and lungs. The vibrio was isolated from the stomach and intestines only. A natural infection with a *Pasteurella* strain which was isolated from the blood complicated the picture. The second fatality was in a cat that was given 500,000 million of a colon bacillus strain of human origin 24 hours before receiving a dose of 25,000 million vibrios, and also died in 36 hours.

Oral infection of suckling kittens, aged two days, was also undertaken by soiling the mother's teats with a vibrio culture. Two were used, one receiving in addition a vibrio suspension by mouth equal to one quarter of an agar slope growth. Diarrhoea developed in both after 7 days, with death 48 hours later. Post-mortem examination showed congestion of the small intestine, liver, spleen and kidneys and also broncho-pneumonic patches in the lungs. *V. cholerae* was isolated from the stomach, intestines and lungs. The mother cat living in the same cage for 10 days was not infected. Hypo-acidity of the stomach of the newly-born was considered to be a factor favouring the infection.

Experiments on frogs weighing 20 gm. produced fatal results when a dose of 200 million *V. cholerae* was injected intramuscularly. When kept at 37°C. they died in 12 hours and at 18°C. in 24 hours. At post-mortem examination the organs were congested and the vibrio was easily isolated from the blood and tissues.

Death in 24 hours was also produced by the intramuscular injection of a solution prepared by digesting the vibrios with NaOH and subsequently neutralizing with HCl. It was presumed that death was probably due to "toxaemia resulting from the liberation of bacterial endotoxins". The possibility of parenteral spread of the vibrio after oral infection is discussed.

J. Taylor

SINGER, E., WEI, S. H. & HOA, S. H. **Immunological Studies of Cholera Filtrates.** *J. Immunology.* 1948, Aug., v. 59, Nov. 4, 341–8.

An account is given of studies on an *in vitro* test for the protective value of antibodies produced by cholera immunization, and of related antigenic analyses. The authors had found that a "Filtrate Factor" (F.F.) obtained from cultures of *V. cholerae* under suitable conditions had a specific effect on the epithelium of the guineapig ileum.

The filtrates are prepared from cultures on beef-extract peptone broth, and from agar cultures pressed through cloth, centrifuged and passed through a Seitz filter. Their action is tested on lengths of the guineapig ileum; only the last 10–15 cm. portion is used. The ileum is washed in Tyrode solution, turned inside out to expose the epithelial surface and cut into pieces 3 mm. in length. One half ml. portions of the solutions to be tested are placed in test tubes and a piece of the ileum is added to each; the result is read after incubation in the waterbath for one hour. "When the reaction is positive the liquid surrounding the intestine becomes turbid and floccules are suspended in it consisting of epithelial cells and mucus which detach themselves from the piece of ileum when the tube is shaken. When the reaction is negative the liquid remains perfectly clear."

The dilutions at which filtrates were found to be active varied with the strains used and with the methods of culture employed. A recently isolated Ogawa strain passed twice through mice was found to be active at a dilution of 1 in 1,280. The best results were obtained in beef-extract broth containing 1 per cent. agar at *p*H 7·5 and with incubation for 24 hours. F.F. was found to be very heat-labile and easily destroyed by acid and by ageing. The addition of 0·5 per cent. phenol had only a slight action on the titre of the filtrate, but the addition of 0·3 per cent. formaldehyde resulted in a complete loss of activity. Autolysates and suspensions of cholera vibrios gave uniformly negative results in similar tests.

Antigenic analysis was carried out with "O" and "OH" sera and with sera prepared against the filtrates, "O" and "OH" vibrio suspensions also being used.

Neutralization of F.F. by antibacterial and anti-filtrate sera. Filtrate dilutions of 1 in 20 were mixed with equal parts of dilutions of antibacterial sera and after 30 minutes' contact at room temperature a piece of ileum was added. The results were read after one hour of incubation in the waterbath. The action of F.F. was neutralized only by sera containing "O" antibodies. "OH" sera which had been absorbed with "O" suspensions but still contained agglutinins active against "OH" suspensions had no neutralizing power. Similar results were obtained with filtrate antisera. Filtrate antisera when absorbed with "O" suspensions were able to agglutinate "OH" suspensions and to produce a precipitate when added to filtrates.

Interaction of antifiltrate sera and filtrate.—This was tested by mixing a 1 in 5 dilution of the serum with an equal part of the filtrate. After keeping the mixture for one hour in the waterbath at 37°C. and then two hours in the refrigerator, the resulting precipitate was centrifuged off and the supernatant fluid titrated by the same method. The filtrates inactivated, to a considerable extent, the neutralizing antibodies and the agglutinins against " O " suspensions ; the neutralization of " O " antibodies was, however, not complete and the titre of the serum against " OH " suspensions was only slightly lowered. Filtrates which had been rendered inactive by heating or by addition of formaldehyde lost their power of neutralizing the antibodies in the sera. " The agglutinating titre against " O " suspensions however was lower in all sera, although the serum treated with boiled filtrate showed only a slight lessening of agglutinating power."

Both " O " agglutinating and protective antibodies, on the other hand, were removed from the antifiltrate sera by absorption with " O " suspensions. The significance of these differences is discussed : a possibility is that the " O " antigen in the solution in the filtrate may be more labile rather than qualitatively different from that of " O " suspensions ; but " the fact that suspensions of *V. cholerae* and autolysates of vibrios are free from F.F., however, is very suggestive of some essential difference between F.F. and the somatic antigen of the vibrio." The difference cannot be defined on the available evidence.

Results similar to those with the Ogawa strain used were obtained with Inaba and Hikojima forms.

In a " discussion", the authors comment on the nature of the soluble substance obtained from cultures of *V. cholerae* that produces in the guineapig ileum, to a certain extent, the pathological changes found in human cases of cholera. They consider that the production of F.F. may be connected with the virulence of strains, and that its action could explain most of the symptoms of cholera.

Reference is made to BURNET's finding that F.F. is a mucin-splitting enzyme. Its possible status as a toxin is discussed. " The discovery of F.F. will not alter the accepted methods of cholera vaccination at present, as the antibodies produced by the somatic antigen in cholera vaccines protect guineapig ileum against the effect of cholera mucinase." *J. Taylor*

AHUJA, M. L. & GURKIRPAL SINGH. **Observations on Cholera Vaccine.** *Indian J. Med. Res.* 1948, Jan., v. 36, No. 1, 3–14.

The response of human volunteers to inoculation with vaccines prepared from different forms of *V. cholerae* was studied by estimation of rise in bactericidal titre of their sera and the value of the sera for passive protection of guineapigs. Groups of six persons received a single dose of 1 cc. of a vaccine (8,000 million vibrios per cc.) consisting of a suspension of agar culture killed by 0·5 per cent. phenol. Three types were used, *viz.*, pure Inaba form, pure Ogawa form and mixed Inaba and Ogawa in equal parts.

Bactericidal titre.—Prior to inoculation, natural bacteriolysins for *V. cholerae* were found to be present in the sera at a maximum titre of 1 in 135 in seven, 1 in 45 in three and 1 in 15 or less in eight of the subjects. Ten days after inoculation of each group of 6 persons with one or other of the three types of vaccine, bactericidal tests were carried out against both Inaba and Ogawa form suspensions, with different strains from those employed for the preparation of the vaccines. The dilutions used were from 1 in 15 to 1 in 300,000. The sera of all subjects showed a rise in bactericidal titre, the range being from 1 in 400 to 1 in 100,000.

Bacteriolysins against both the homologous and heterologous forms were found to have been developed by inoculation with either of the pure-form

vaccines and with the mixed vaccine. In the majority of the subjects the bactericidal titre was higher against the homologous form than against the heterologous form, but in a number of the sera the titre for both strains was the same. With the strains used for the preparation of the vaccines, higher titres were obtained with pure Inaba vaccine than with the pure Ogawa or mixed vaccines. The response to inoculation was specific, no bactericidal action being shown against *Salm. typhi*, *Bact. coli* and three non-cholera vibrio strains.

A table in the text shows the level of agglutinin titre produced: in one case only the titre reached 1 in 125/250, but in the rest it varied from *nil* to 1 in 50/125.

The rate of development of bactericidal power was studied in three subjects inoculated with pure Inaba form vaccine. A gradual rise of titre was observed, which began on the 3rd day after inoculation, a considerable increase being shown by the 5th day and a maximum level being reached by the 8th day. By the 30th day, a considerable fall in titre occurred and the decline continued in the six months period of observation. The authors conclude that—" it can be assumed that up to the 3rd day there is practically no immunity, between the 3rd and 5th days there is partial immunity and after the 5th day there is considerable immunity ", and also that —" for practical purposes the adoption of a six-day period for quarantine regulations is probably suitable although it appears that a high [higher ?] degree of immunity would be obtained in 8 to 10 days ".

The bactericidal response obtained on re-inoculation 6 months after the primary dose was found to be poor. In no case did it reach the level obtained by the primary stimulus and in some subjects no rise at all was shown.

Passive protection tests.—These were carried out in guineapigs by intravenous injection of doses of sera of known bactericidal titre from inoculated subjects, in a range from 0·0001 cc. to 1 cc., followed four hours later by intraperitoneal injection of a mucinized suspension of a six-hour culture of *V. cholerae*. The results show the correlation between the passive protective value of the sera and their vibriocidal titre. A dose of 0·01 cc. of serum with a bactericidal titre of 1 in 100,000 protected guineapigs against the intraperitoneal test infection with a homologous vibrio strain, while no protection was obtained with 100 times that dose of the serum of a non-inoculated subject.

In similar tests with sera of subjects inoculated with pure Inaba or Ogawa form or mixed vaccine, and challenged by both, the sera of those inoculated with the mixed-type vaccine were found to have passive protective substances in a greater concentration than sera of those immunized with a pure Inaba or pure Ogawa vaccine.

Active immunization of guineapigs.—No significant difference was found in the results of immunization of guineapigs with either the pure type or mixed vaccines, when challenging doses of both the Inaba and the Ogawa form were used. " An Inaba strain vaccine affords just as good protection against Inaba infection as against Ogawa infection and vice versa ".

[One level only of challenging dose appears to have been employed, and no indication is given of the number of lethal doses contained.]

The authors do not consider that the active immunization of mice or guineapigs is suitable as the sole criterion for determining the relative merits of strains for use in the preparation of cholera vaccine, and prefer the passive protection test as being more sensitive. They find the development of agglutinins after cholera vaccination to be at too low a level for assessing the degree of immunity produced. " The infection-resisting capacity of protective substances present in the sera of vaccinated subjects is higher for homologous than for heterologous sub-type infection."

J. Taylor

SEAL, S. C. **On the Control and Prevention of Endemic Cholera in the Rural Areas of Bengal.** *J. Indian Med. Ass.* 1948, July, v. 17, No. 10, 319–21.

Suggestions are made for (*a*) short term or temporary measures and for (*b*) long term or permanent measures, for the control and prevention of cholera in rural Bengal.

The short term measures recommended are : (1) early notification by the village authority ; (2) visit by a health officer with suitable supplies for disinfection and treatment ; (3) treatment of the cholera case with sulphaguanidine and oral administration of *dab* water or sodium-bicarbonate-glucose solution (intravenous saline only in advanced cases) ; (4) prophylactic administration of acid mixture (3 parts acid sulphuric aromat, and 1 part spt. chloroform, in water) to all contacts, and sulphaguanidine to contacts showing suspicious symptoms ; (5) isolation and hospitalization of cases in temporary sheds or mobile camps ; (6) anti-cholera inoculation. (The author has considered it advisable to avoid inoculation of the members of an affected family for at least three days, as there may be a risk that the measure would be discredited if members inoculated during the incubation period develop cholera.)

Long term measures.—The author considers that " investigation into the local circumstances and factors which operate in causing repeated outbreaks is a pre-requisite for planning effective preventive measures." For the purpose it is suggested that a " special Epidemic Control Unit " should be formed to take care of the infectious diseases of a sub-division with an average population of 800,000 at an annual cost of about ½ anna *per caput*. While carrying out control work, the Unit would keep continuous records of communicable disease in its area, which might be used for forecasting epidemics so that early measures could be adopted to abort them.

The provision of a " Segration Cottage " in each village is advocated so that early cases may be isolated. The author does not consider general yearly reinoculation to be feasible but, for the prevention of importation of infection, believes that cholera could be greatly reduced by insistence on inoculation 7 days before departure to attend a *mela* or a religious congregation, and on yearly reinoculation for those regularly visiting trading centres or industrial areas. For reinoculation the author prefers the intradermal administration of 0·1 cc. of the vaccine.

The importance of *melas* and pilgrimages in the dissemination of infectious disease is recognized by the recommendation for the provision of permanent sanitary arrangements at major perennial centres and for special measures at smaller *melas* and festivals of short duration.

The necessity for health teaching in school and community life is stressed.

[The measures of more permanent nature which are essential for the reduction of the risk of cholera in the endemic areas are not dealt with in this paper, namely, provision of protected water supplies and improvement in environmental sanitation.] *J. Taylor*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

HANSEN, E. L. & ANDERSON, H. H. **An Essentially Synthetic Liquid Medium for *Entamoeba histolytica*.** *Parasitology*. 1948, July, v. 39, Nos. 1/2, 69–72. [13 refs.]

The nutritional requirements of *Entamoeba histolytica* in culture with " organism *t* " were studied, and a liquid medium was devised to maintain the amoebae in an actively reproducing form. Subcultures were performed every

four days, by which time the amoebae numbered 400,000 per culture tube, the transfer consisting of 0·25–0·5 cc. of the sediment. The medium was prepared from stock solutions kept at varying concentrations and diluted to the necessary strength with distilled water; sterilization was effected by autoclaving at 120°C. for 7 minutes. The *p*H range was from 7·48 on the day of transfer to 7·1 in four-day-old cultures. The medium contained the following constituents :—buffered saline, 5 trace minerals, 12 amino-acids, 10 vitamins of the B complex, nucleic acid, cholesterol and, finally, rice powder, the only non-synthetic ingredient though the presence of the organism *t* was also essential for proper growth. The critical requirements of the ingredients are being further studied. *P. C. C. Garnham*

DERRICK, E. H. **A Fatal Case of Generalized Amoebiasis due to a Protozoon closely resembling, if not identical with,** *Iodamoeba bütschlii*. With a Comment by C. M. WENYON. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1948, Sept., v. 42, No. 2, 191–8, 21 figs. on 4 pls.

This unique case of amoebiasis differed from other fatal cases that occurred in Japanese prisoners of war in the wide and bizarre distribution of lesions. The stomach, small intestine and colon were ulcerated, and metastatic foci were present in the brain, both lungs, gastric and mesenteric lymph glands, but not in the liver. In most of the lesions the amoebae are exceedingly numerous.

The organism is definitely not *Entamoeba histolytica*, but closely resembles *Iodamoeba bütschlii*. The patient, a Japanese soldier, aged 22, was captured near Buna, New Guinea. He was treated for malaria and dysentery, but failed to respond and died on the sixth hospital day. At post-mortem, the surface of the brain showed a depressed area in the lateral aspect of the right parieto-occipital region. The stomach showed numerous shallow ulcers; they were rounded, irregular or confluent. In the small intestine at the midpoint there was an ulcer with yellow edges and congested floor. Seven rounded ulcers were present in the large intestine, resembling those in the small. The presence of amoebae, often in enormous numbers, is the most significant feature in the histology. They show the same morphology everywhere. In size they vary considerably—the extremes being 3 μ and 12 × 9 μ—averaging 6–8 μ, about that of the neutrophil leucocytes.

The cytoplasm, granular and foamy, occasionally includes small vacuoles and ingested red blood corpuscles, especially in the brain lesion. The nucleus usually measures 2 to 2·5 μ in diameter and consists of a large, central karyosome, surrounded by a clear zone which in turn is encircled by a delicate nuclear membrane. Sometimes the karyosome is indented, and this may represent a stage in division. Occasionally the amoebae contain two nuclei, which is evidence of their rapid multiplication. No forms resembling cysts were recognized. The large central, spherical karyosome and delicate nuclear membrane resemble those of *Iodamoeba*. The size of the trophozoites is also consistent with that reported for *I. bütschlii* in faecal smears. [No adequate examination of the faeces appears to have been made.]

In its behaviour in the tissues, this amoeba resembles *E. histolytica* but the distribution of the lesions is unusually extensive, even for *E. histolytica*, and histolytic action is well demonstrated in the brain sections where red cells are being ingested. As with *E. histolytica*, so in the intestinal ulcers, amoebae are found most frequently beyond the area of cellular reaction. Dr. C. M. Wenyon also examined the material in consultation with Dr. C. A. Hoare and agreed that the similarity with *I. bütschlii* amounts almost to complete identity. It would not be justifiable to consider the amoeba as a new species. It appears to be an instance of unusual invasion of the various organs by an amoeba from the intestine.

On the analogy with *E. histolytica*, which often exists in the intestine without further invasion, it is reasonable to assume that conditions arose which enabled this common coprozoic species to invade the tissues.

The phagocytosis of red blood cells by *I. bütschlii* has not been previously recorded.

The paper is illustrated by 3 photographs and 18 excellent photomicrographs.

P. Manson-Bahr

CRITCHLEY, C. F. **Liver Abscess: Sporadic Amoebiasis.** [Memoranda.] *Brit. Med. J.* 1948, Oct. 9, 681–2.

This letter relates to a man of 34, who had never been out of Britain nor had had any tropical associations, but who developed a liver abscess without previous illness.

He presented with a history of five-day epigastric pain, worse on deep inspiration, and associated with vomiting. No mass was felt and the liver was not palpable. There was a leucocytosis of 27,000 per cmm. (81 per cent. neutrophiles) and the diaphragm, on X-ray examination, was shown to be raised about 1 inch. After 5 days of continued symptoms the abdomen was opened and a large very soft liver was found, reaching to the right iliac fossa. Five pints of " anchovy-sauce " pus were aspirated on exploration of the right lobe of the liver: a further loculus yielded one pint of yellow pus. Penicillin (100,000 units) was instilled in the cavity, which was drained.

The pus was sterile and no amoebae nor cysts were found in it nor in the stools on repeated examination. No radiographic abnormality was found in the bowel. Sigmoidoscopy showed " the smooth, pale, glassy and rather rigid mucous membrane associated with chronic amoebiasis ". " A full anti-amoebic course " was therefore given with immediate and dramatic response.

[The nature of the anti-amoebic treatment, or of the dramatic response, is not described. The latter is complicated by the fact of penicillin having been given in a case where examination of the pus was negative. However significant the findings, as the present data undoubtedly are, an unqualified diagnosis of " sporadic amoebiasis " in the absence of amoebae, specific changes in the bowel or of known exposure and in the presence of a marked neutrophile leucocytosis, is perhaps a bold one.] *H. J. O'D. Burke-Gaffney*

NIÑO, F. L. Estudio clínico y parasitológico de un caso de colitis ulcerosa por asociación de " Balantidium coli " y " Endamoeba dysenteriae ". [**A Case of Ulcerative Colitis associated with the presence of** *Balantidium coli* **and** *Entamoeba histolytica.*] *Prensa Méd. Argentina.* 1948, Aug. 13, v. 35, No. 33, 1601–4, 15 figs.

RELAPSING FEVER AND OTHER SPIROCHAETOSES

BALOZET, L. Le spirochète de la récurrente de la dernière épidémie de spirochétose Nord-Africaine. [**The Spirochaete in the Last Epidemic of North African Relapsing Fever.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 3/4, 146–9.

The author has studied the properties of a strain of this louse-transmitted spirochaete isolated from cases of the disease during the great epidemic in North Africa [see this *Bulletin*, 1946, v. 43, 44]. Inoculation into mice produced very slight infections which only lasted for a few hours, and it was never possible to continue passages in mice. Attempts at cultivation with the

medium recommended by CHORINE [see this *Bulletin*, 1943, v. 40, 917] with fresh rabbit serum, gave negative results in all subcultures. Experiments on the culture of the spirochaetes in incubating eggs gave 12 negative results and 7 positive, the number of passages in these ranging from 1 to 19. It was found necessary to use only two drops of heavily infected defibrinated blood (or slightly citrated), and the blood had to be inoculated as soon as possible. For passages from egg to egg, the blood of the embryos was mixed with the allantoic fluid and slightly citrated. When successful, the spirochaetes appear in the blood of the embryo 3 or 4 days after inoculation, and persist until the embryo is ready to hatch. The passages are very difficult and irregular, and after the 14th passage the spirochaetes undergo morphological changes suggestive of degeneration. *E. Hindle*

BALTAZARD, M., BAHMANYAR, M. & MOFIDI, C. Sur les infections à spirochètes transmises par les Ornithodores en Iran. [**On Spirochaetal Infections transmitted by *Ornithodorus* in Iran.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 3/4, 141–6.

The authors have examined the two species of rodents commonly associated with man in Iran, namely the common mouse *Mus musculus*, and the small hamster *Cricetulus migratorius*, to see whether they act as reservoirs of *Spirochaeta persica*, transmitted by *Ornithodorus tholozani*.

Numbers of these rodents were caught in houses in a small village, Hessarek, during January to March 1946; 65 mice and 69 hamsters were killed in lots of 3 or 4, and an emulsion of the brains of each lot was inoculated into a guineapig rat and mouse, respectively. On only one occasion was a spirochaete isolated from wild mice, and this was found to be *S. persica*. Subsequently a total of 127 mice, 380 hamsters, 4 bandicoots, 25 *Rattus norvegicus*, 5 *R. alexandrinus*, 83 *R. frugivorus*, 4 porcupines and 2 foxes were examined, with negative results so far as this spirochaete was concerned. On the other hand, an organism described by RAFYI [see this *Bulletin*, 1947, v. 44, 92] as *Spirochaeta microti*, was often found in both mice and hamsters. Large numbers of *Ornithodorus erraticus* were collected from the burrows of animals in various parts of Iran and by feeding these ticks on white rats, 15 strains of *S. microti* were obtained. These varied considerably in their pathogenic properties, some strains producing either inapparent infections or blood infections of only 24 to 48 hours duration, and others an infection with spirochaetes in the blood for 28 days.

Two human subjects inoculated with blood containing numerous spirochaetes, showed a slight febrile reaction with the presence of very rare spirochaetes in the circulation. Another subject was bitten by naturally infected *Ornithodorus* from a burrow, and showed a febrile reaction, but without any spirochaetes being found in the blood; another person bitten by ticks infected in the laboratory showed a febrile reaction associated with the presence of rare spirochaetes.

Finally the author gives a list of spirochaetes from the Old World rodents which seem to be either identical or closely related, and all transmitted by species of *Ornithodorus*, as follows :—

Spirochaeta crocidurae Léger, 1917, in Dakar, transmitted by *O. erraticus*.

S. naganophila Savini, 1923, in white mice.

S. normandi C. Nicolle, Anderson and Colas-Belcour, 1927, in South Tunisia, transmitted by *O. normandi*.

The spirochaete isolated from the brain of a rodent at Katanga by Adant, 1932.

The spirochaete found in *O. erraticus* in South Morocco by Baltazard and subsequently in rodents by G. Blanc and provisionally named *Spirochaeta merionesi*.

S. latyschevi found in the rodents of Usbekistan by Pavlovsky and his fellow workers in 1945, transmitted by *O. tartakowsky*. [See this *Bulletin*, 1946, v. 43, 743].

Finally *S. microti* found in Iran by Rafyi in 1946, described in the present communication. *E. Hindle*

DELPY, L. P., RAFYI, A. & MAGHAMI, G. D. Transmission de *Spirochaeta microti* Rafyi 1946 par *Ornithodorus canestrini* (Birula 1894) et *Ornithodorus lahorensis* Neumann 1908. [**The Transmission of** *Spirochaeta microti* **Rafyi 1946 by** *Ornithodorus canestrini* (**Birula 1894**) **and** *Ornithodorus lahorensis* (**Neumann 1908**).] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 3/4, 136–9.

The authors have succeeded in transmitting *Spirochaeta microti* from infected rats or mice to normal rats by the bites of *Ornithodorus canestrini* and *Ornithodorus lahorensis*. The ticks were fed on the infected rodents and then after intervals ranging up to 300 days, fed on normal rats, or in one case, the contents of the tick were ground up and inoculated into rats.

It is curious that these ticks can serve as the host of this spirochaete of wild rodents, as hitherto all attempts to transmit *S. persica* by these two species had given uniformly negative results. *E. Hindle*

BALTAZARD, M., MOFIDI, G. & BAHMANYAR, M. Essai de reclassement de certains spirochètes récurrents. [**An Attempt to reclassify certain Relapsing Fever Spirochaetes.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 399–405.

The authors summarize information on the spirochaete found in rodents and also in *Ornithodorus erraticus* collected in burrows in both north and south Iran. This organism, known as *Spirochaeta microti*, is transmissible both by ticks and also the louse, *Pediculus humanus*.

The study is based on the examination of 17 strains. New-born rodents can be infected either by the inoculation of blood containing spirochaetes or the bites of infected *Ornithodorus*. The incubation period is always less than five days and invariably fatal on the 2nd to 4th day of infection with very large numbers of spirochaetes in the blood. White mice, grey mice, hamsters, bandicoots, white rats and rabbits give similar results ; but new-born guinea-pigs, which are born at a later stage of development, are resistant and only show a feeble infection which is never fatal.

Adult mice after inoculation show an incubation period of 8 days followed by 10 to 12 days during which the blood may contain up to 100 spirochaetes per field. The type of infection in these animals is very constant. Other rodents show very great differences in their susceptibility, and adult guineapigs seem to be completely resistant.

The pathogenicity of 3 strains has been tested in 9 human subjects. Some were inoculated with infected blood and others infected by the bites of *Ornithodorus erraticus*. There was an incubation period of 4 to 10 days, followed by 3 to 5 febrile attacks not exceeding 3 days each and with a total duration of 30 to 51 days. Spirochaetes were found in the blood usually only after several examinations, and were never numerous. No meningeal or nervous symptoms were ever observed.

The authors then studied a strain of *S. merionesi* from South Morocco, and found that it was much more virulent to white rats, hamsters, etc. often producing a fatal infection.

Finally the original strain of *S. crocidurae* isolated at Dakar more than 20 years previously was obtained and in its properties found to resemble closely *S. merionesi*.

Spirochaeta microti is of the same type and all these strains are transmissible both by *Ornithodorus erraticus*, and probably allied species, and also by lice. As the infection is widely distributed in rodents they constitute a source of danger, especially as they can be transmitted by *Pediculus*.

This group of spirochaetes, probably identical with *S. crocidurae*, is very distinct from those belonging to the *duttoni* group which have different biological properties and are transmitted by other species of *Ornithodorus*. *E. Hindle*

ZAHARIA, N. I. Viteza de sedimentare a hematiilor in cursul febrei recurente. [**The Erythrocyte Sedimentation Rate in Relapsing Fever.**] *Rev. Ştiinţelor Med.* Bucharest. 1948, May–June, v. 37, Nos. 5/6, 209–17, 2 figs. French summary.

The author in 1945–46 working in the Stamate Hospital, Fălticeni, Rumania, studied the ESR daily in 58 cases of relapsing fever. Several variations were recognized, but in general the rate was markedly increased both during an established attack and when there were few or no symptoms. Between the attacks, levels became more or less normal, and they returned completely to normal about 5 to 15 days after the end of the disease.

These findings in relapsing fever appear to be the reverse of those observed by the author previously in cases of epidemic typhus (*Rev. Ştiinţelor Med.*, 1946, v. 35, 317): and he suggests that this difference might be of value in differential diagnosis in some cases.

The findings are illustrated graphically in two figures.

H. J. O'D. Burke-Gaffney

YAWS

SCHERPENHUYSEN, A. A. Bismuth en behandeling van framboesia tropica. [**Bismuth in the Treatment of Yaws.**] *Nederl. Tijdschr. v. Geneesk.* 1948, Sept. 4, v. 92 (iii), No. 36, 2741–9. [17 refs.] English summary (7 lines). [20 refs.]

A total of 2,067 sufferers from yaws were treated with bismuth, with mapharsen or with bismuth combined with arsenical preparations. It became apparent from the duration and from the results of treatment that the three methods gave practically the same results. Possibly those patients treated with mapharsen were more satisfactory. The favourable results of the work of a mobile anti-yaws team are commented upon. The author was medical officer to the 13th mobile team of the Netherlands Red Cross, working on the east coast of Sumatra. *P. Manson-Bahr*

LEPROSY

TEICHMANN, G. O. **What of the Children ?** *Leprosy in India.* 1948, Apr., v. 20, No. 2, 103–8.

This obscure title refers to a valuable report on the ultimate results in children treated at the 6 Children's Homes in the Purulia Leper Home and Hospital during the past 20 years, including those in the Home before 1927, since when accurate records have been kept, and those admitted during three 5-year periods up to 1942. Only 2 of 63 healthy children, who had been exposed to infection before admission, developed leprosy previously to 1927 against a possible infection rate in their infected homes of 25 to 30.

One hundred and fifty-one children were in the Homes in 1927. Of 63 in the " Healthy Homes ", where the children have been separated from leprous relations, 56 (89 per cent.) are now well. Of 54 with neural leprosy, 25 are well, but of 34 lepromatous cases none are well, 18 are dead and only 2 improved; debility and tuberculosis were the common causes of death. Between 1927 and 1942, 120 children were admitted to " Healthy Homes ", 36 are still well and remain in the Homes, 56 are at work or married, many with healthy children; 23 developed signs of leprosy and were returned to the Colony, but only six now have active disease, 11 are dead and 11 untraced.

Again, 120 children were admitted after 1927 to " Observation Homes ", for neural cases and those in whom bacilli cannot be found, and 73 are still well, 13 have active disease, 9 are much better, in 7 the disease is arrested with deformity, 8 are dead and 10 untraced. Similarly of 132 children admitted to " Infectious Homes " in 1928 to 1942, 5 remain healthy, 26 improved and left, 73 still have active disease, 4 have arrested disease with deformity, 20 are dead and 4 untraced. Thus children who were separated from their infected parents either remained free or developed only a mild form of leprosy, the great majority of them becoming symptom-free without deformity on treatment; these children did not show the severe form they often show if left with their infected parents or relations. The use of this plan on a large scale should therefore result in far fewer leprosy cases later. *L. Rogers*

Juan Puiggrós, P. Una cepa española del *Myc. leprae* (Hansen) Lehmann et Neumann. [**A Spanish Strain of** *Mycobacterium leprae.*] *Rev. " Fontilles ".* Valencia. 1948, Jan., v. 2, No. 1, 38–45, 6 figs. on 3 pls. [109 refs.] English summary.

After a brief sketch of the numerous reports of bacteria cultivated from leprosy patients, the author describes an organism isolated from a leproma carefully removed, triturated and planted on various media, and part homogenized for studing the morphology of the many bacteria present. Morphologically, those isolated were typically like *Myco. leprae* and stained in the same way. Growth was slow; after 3 years the colonies were only 8–10 mm. in diameter on Löwenstein's red and Löwenstein's green media, on Dorset, Petroff, Petragnani without asparagine, or de Sauton and vitamin B and C. There was no growth on the ordinary media. The organism will grow at room temperature, but the optimum is 36–38°C. It is pathogenic to the white rat, the mouse, the guineapig and the rabbit.

The author maintains that it is a strain of *Myco. leprae* on the grounds of its morphology and staining reactions, of its not belonging to the acid-fast saprophytic group, of its pathogenicity for rats and mice. It differs from Johne's bacillus; it was obtained from a leproma extirpated aseptically. In conclusion, he compares it with and indicates the differences from the organisms of Duval and Clegg, Barry, Kedrowsky, Lleras, Vaudremer, Reenstjerna and others. *H. Harold Scott*

Alvarez Lowel, L., Rodriguez-Perez, A. P. & Puchol, J. R. La participación de los centros nerviosos en el sustratum histopatologico de la lepra. [**The Histopathology of the Nerve Centres in Leprosy.**] *Rev. " Fontilles ".* Valencia. 1948, July, v. 2, No. 2, 101–14, 23 figs. on 8 pls.

The authors have studied the morbid histology of the nervous tissues, central and peripheral, in three cases of leprosy. Fragments were fixed in 10 per cent. formol, in 15 per cent. neutral formol, in Cajal's formol-bromide and in rectified

spirit. Some sections were made of frozen tissues and some by the paraffin-embedding method. Several silver impregnation methods were used, as well as haematoxylin and eosin, and Sudan III. The different parts, the peripheral nerves, neuroglia, grey and white matter are described in minute detail. The posterior tracts, particularly that of Goll, are picked out and, to a less extent, the lateral tract. Higher up the nerve cells are degenerated and there is marginal and perivascular gliosis. In general it is said that the response is that characteristic of toxic action leading to central degeneration, secondary to initial gliosis. In the optic nerve and chiasma there is acute oedema of the dendroglia. "The histological picture is in part due to peripheral lesions arising in the ganglia and nerves, and in part to toxic processes similar to those met with in chronic, non-specific affections." The conditions described in the text are well shown in a series of 23 photomicrographs. *H. Harold Scott*

DE DULANTO, F. La biopsia por aspiración de la médula ósea en la lepra. Técnica y resultados. [**The Bone Marrow in Leprosy.**] *Rev. "Fontilles".* Valencia. 1948, Jan., v. 2, No. 1, 4–16, 8 figs. (7 on 4 pls.) [36 refs.]

LOWE and DHARMENDRA found, in 16 out of 32 nodular leprotics, bacilli in the bone marrow, but in only one out of 18 with the nervous type of the disease. The author has examined the marrow obtained by sternal puncture in 13 patients with "leprotic leprosy" [*i.e.* with lepromata] and 8 with the leprous reaction. By the usual method he withdraws 2–3 cc. of marrow. In 6 of the 13 with lepromata he found *Myco. leprae*; in two of them typical Virchow cells charged with the bacilli. In all these, the skin, the nasal mucosa and the lymph glands were also positive, as they were even in those whose marrow proved negative. The myelogram showed, in addition to the Virchow cells, a metamyelocytosis, eosinophiles normal or slightly increased and an erythroblastic reaction. The peripheral blood of the positive cases showed a neutrophilia, a slightly increased eosinophilia (but not constantly), monocytes on the high side, in the reactions up to 15–20 per cent. The marrow changes are ascribed to simple inflammatory or specific granulomatous lesions with inadequacy of haemopoiesis and consequent anaemia and leucopenia in the peripheral blood slides.

Since the sulphone derivatives—promin, diasone, promizole, sulphetrone—provoke haemolytic anaemia and leucopenia, even agranulocytosis, it is thought that periodic examination of the marrow may serve to indicate danger arising from the use of these drugs. *H. Harold Scott*

NUÑEZ, V. Los casos indeterminados de lepra. Revisión general. [**A Review of "Indeterminate" Cases of Leprosy.**] *Rev. "Fontilles".* Valencia. 1948, July, v. 2, No. 2, 115–60, 7 text figs, & 14 figs. on 5 pls. [Bibliography.]

GOLD, S. **Leprosy in British Nationals.** *Brit. J. Dermat. & Syph.* 1948, Apr., v. 60, No. 4, 139–43, 1 fig. [13 refs.]
An account of two cases.

SILVEIRA, L. M. O mal perfurante plantar na lepra. [**Perforating Ulcer of the Foot in Leprosy.**] *Rev. Brasileira Leprologia.* S. Paulo. 1948, Mar., v. 16, No. 1, 7–32, 40 figs.

A well-illustrated account of perforating ulcer of the sole in leprosy. Photographs show the clinical conditions of these ulcers in their various stages and X-rays demonstrate the bony changes. If the patient comes under observation early, that is before any bone erosion has occurred, the lesion clears up

rapidly in 3 weeks or so, the patient resting the limb and keeping the foot encased in plaster. If, however, the bony structures have become involved, operative treatment is necessary—disarticulation of the tarsal joints, the metatarsals and phalanges, resections and amputations—according to the stage and the extent of involvement. Among 3,000 inmates of the Pirapitingui colony in São Paulo, 693 such operations were performed. *H. Harold Scott*

GUILLEN, J. & IBARS, A. Intensas leprorreacciones sobre un injerto cutaneo. [**Intense Leprosy Reactions over a Skin Graft.**] *Rev. "Fontilles"*. Valencia. 1948, Jan., v. 2, No. 1, 27–9, 2 figs. on 1 pl.

SCHUJMAN, S. **Comparative Study of Chaulmoogra in High Doses and Promin in the Treatment of Leprosy.** *Internat. J. Leprosy.* 1948, Apr.–June, v. 16, No. 2, 145–6.

The author, in Rosario, Argentina, injected both intramuscularly and intradermally monthly doses of 120 to 150 cc., according to tolerance, of ethyl ester chaulmoograte with 4 per cent. creosote or 0·5 per cent. iodine. Promin was given intravenously in doses of 5 gm. daily, except on Sundays, up to a total of 500 gm. in a series, with fifteen days' rest after each series. Although no patient gave up treatment, chaulmoogra caused more discomfort than promin. Treatment for eighteen months showed both drugs to be efficient with similar favourable results within the same period of time as regards both dermal and mucous membrane lesions, and with the same fragmentation and diminution of lepra bacilli and healing of erosions and ulcerations. Longer observations are necessary to establish whether one of the two is more effective.

L. Rogers

COCHRANE, R. G. **A Comparison of Sulphone and Hydnocarpus Therapy of Leprosy.** *Internat. J. Leprosy.* 1948, Apr.–June, v. 16, No. 2, 139–44.

The author only considers the lepromatous class of cases in which sulphones have been favourably reported on. He concurs in the opinion of SCHUJMAN [this *Bulletin*, 1948, v. 45, 441] that the success of hydnocarpus treatment is largely dependant on dosage up to 400 cc. in a year and on the use of the intradermal method. Six years' work showed 17·5 per cent. negative and 40·2 per cent. improved by equal dosage subcutaneously and intradermally, against 12·3 per cent. and 34·2 per cent. respectively with 15 cc. of the oil injected per week, which is the optimum dose. Moreover, in 167 early lepromatous cases 84 (50·3 per cent.) became negative under adequate dosage of hydnocarpus oil after an average of 94 weeks' treatment.

On the other hand, two years' trial of sulphones confirmed the work of PAGET and others, although no case has yet become negative bacteriologically, so the time required to effect this is still too long ; promin was the least satisfactory preparation and too toxic for Indian patients. Sulphetrone appears to be the drug of choice, for diasone precipitates reactions in 25 per cent. of cases. The author prefers to commence with 4 tablets a day and increase by two every second day up to 12 daily and does not allow any rest period unless the red corpuscles fall below 3 million and the haemoglobin below 45 per cent. The bowels must be kept freely open as constipation may be dangerous.

The disadvantages of sulphone treatment are the necessity for close daily supervision and the present prohibitive cost for large numbers of Indian patients. The author therefore gave sulphetrone in an emulsion with 25 per cent. arachis oil and 0·5 per cent. beeswax to obtain blood levels of 1 to 3 mgm. per cent. and skin concentrations of 5 to 12 mgm. per gramme of skin tissue on

injection, by which means relatively small doses are required. Thus, in two similar cases much greater improvement clinically and bacteriologically was obtained by the injection of 70 gm. of a 25 per cent. suspension of diaminodiphenyl sulphone in eleven months than by giving 2,471·5 gm. of sulphetrone orally for 16 months. A method of examining sixteen smears from each patient to obtain a bacteriological index is advised for the control of results.

The author therefore advises sulphones only in advanced lepromatous cases, especially those with nasal and laryngeal symptoms, and in cases not improving on adequate hydnocarpus treatment or who have relapsed. Intensive intradermal use of hydnocarpates is insisted on, as it accounts for the better results in lepromatous cases under hydnocarpates than under sulphones in Indian patients. *L. Rogers*

Sharp, E. A. & Payne, E. H. **The Present Status of the Sulfones in Therapy.** *Internat. J. Leprosy.* 1948, Apr.–June, v. 16, No. 2, 157–72. [161 refs.]

This paper, which should be read by those interested deals mainly with history of sulphone preparations. Promin has proved not to be dangerously toxic. Promizole is useful in leprosy, but is difficult to make and is expensive. Promacetin is of use in pneumonia and leprosy and diasone and sulphetrone in the latter disease. Benadryl is a useful adjunct in treatment of the lepra reaction. *L. Rogers*

de Souza Lima, L. & others. **Present Status of Sulfone Therapy at the Padre Bento Sanatorium.** *Internat. J. Leprosy.* 1948, Apr.–June, v. 16, No. 2, 127–37.

This is a report on the sulphone treatment in 1,287 leprosy patients during four and a half years in São Paulo, Brazil. The results confirm other experience and establish its value. The disease ceases to progress after from three to six months regardless of the degree of advancement of the case. For example, none of 847 lepromatous cases treated for 12 to 36 months have grown worse, but 4·2 per cent. did not improve. During the first six months, temporary aggravation of the symptoms may occur in 12 to 15 per cent. of the patients, but later no relapses have occurred. The degree of improvement varies from slight to total disappearance of the lesions. The beneficial results affect mucous membranes of the nose, mouth, pharynx and larynx, and tracheotomized patients have been able to dispense with their tubes. The progress of eye lesions to total blindness has also been almost entirely prevented under intensive treatment, and extensive corneal infiltrations may largely clear up and become free from lepra bacilli.

A table based on 584 advanced lepromatous cases shows lesions cleared in 8 per cent., much improved 24 per cent., improved 64 per cent. and unchanged 4 per cent. In about 7 per cent. improvement became stabilized and remained stationary after 18 to 20 months' treatment. In 50 per cent., eruption of erythema nodosum, or less frequently of erythema multiforme, occurred ; this is regarded as a favourable sign. Better results were seen in 158 moderately advanced lepromatous cases, with 53 per cent. cleared up, 34 per cent. much improved, 9 per cent. improved and 4 per cent. unchanged. Another table deals with 99 incipient cases, with 67 per cent. cleared up, 14 per cent. much improved, 19 per cent. improved and none unchanged or worse ; the advantage of early treatment is thus apparent.

On the other hand, in lesions of the peripheral nervous system the results have been nil or insignificant, so it is important to start treatment early before such lesions have occurred.

In tuberculoid cases, the tendency to spontaneous recovery makes it difficult to evaluate the effects of sulphone treatment. Some tuberculoid cases may pass into the lepromatous form, or invade nerves with resulting marked mutilations; in 25 of the latter variety, in which tuberculoid lepra reactions had been common, sulphones prevented the recurrence of such reactions, and the cutaneous lesions disappeared or reverted to an uncharacteristic appearance, although nerve lesions were uninfluenced. Similar results were observed in 200 dispensary cases, but the skin lesions in most of them were not completely cleared up after 12 months' treatment. They should also be treated early.

The uncharacteristic cases are still difficult to evaluate because 40 per cent. cleared up spontaneously, and no cases have become lepromatous. In lepromatous cases bacteriological findings in nasal smears showed a reduction of positive results to only 2 per cent. after treatment, with presumably much reduced infectivity, but in advanced lepromatous cases scarification of the nasal mucous membrane gave positive results in 102 out of 879 smears, or 12 per cent. In skin lesions, the results were less favourable, for in 64 biopsy specimens of residual lepromas only 10 per cent. were negative, although morphological changes and reduced numbers of bacilli were frequent. Sections of the sites of old lesions were negative in 50 per cent. and in 45 per cent. only small numbers of morphologically modified bacteria were found. Histological improvement was common, with a tendency to tuberculoid structure. The intravenous administration is preferred in all acute and ocular cases and on the occurrence of erythema nodosum. No serious accidents have occurred in four years.

L. Rogers

ERICKSON, P. T. & JOHANSEN, F. A. **Bone Changes in Leprosy under Sulfone Therapy.** *Internat. J. Leprosy.* 1948, Apr.–June, v. 16, No. 2, 147–56, 8 figs. on 4 pls. [10 refs.]

Bone changes in leprosy depend on neurotrophic disorders due to nerve involvement of a chronic nature, so only slow response to treatment could be expected during the five years of this treatment in Carville of 82 patients with promin, diasone or promizole. Tables record the duration of the sulphone treatment, the bone changes in the hands and feet over a five-year period, and the neural symptoms and their probable response to treatment. Previous Carville studies suggest that in lepromatous cases there are few bone changes except in the form of cysts and osteomyelitis, and it is significant that these lesions appear to respond best to sulphone treatment. There also appears to result some restraint on further progression of bone absorption, so early treatment is indicated. A follow-up period of ten years is likely to be required fully to assess results of this treatment. Four pairs of X-ray plates are included.

L. Rogers

MAUZÉ, J. Un bon médicament adjuvant dans le traitement de la lèpre. [**A Useful Adjuvant in the Treatment of Leprosy.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 326–7.

The following is a translation of the author's conclusion :—

An American preparation, Belivron, consisting of a combination of liver extract, peptonized iron and Vitamin B_1 may be used concurrently with chaulmoogra treatment of leprosy, and without supplementary injection, to control effectively the asthenia and anaemia often seen in cases of leprosy. The attention of the French pharmaceutical manufacturers is drawn to this product.

H. J. O'D. Burke-Gaffney

Sagher, F. & Franco, S. El efecto de los rayos limite sobre las infiltraciones leprosas. II. Informe sobre el intento de influenciar la facies leonina y la ulcera perforante plantar por mediación de radiaciones roentgen de larga longitud. [**The Effect of X-Rays on Cutaneous Lesions and their contained Bacteria in Leprosy.**] *Rev. "Fontilles."* Valencia. 1948, July, v. 2, No. 2, 166–71, 16 figs. on 5 pls.

The treatment by X-rays lasted usually for 6–12 months, but changes were observable in 2–3 months. Smears were made from the tissue during the course and biopsy specimens were taken periodically from the same spot each time, so that strict comparisons could be drawn. Nine patients with nodular leprosy were subjected to the treatment; nodules and infiltrations of the hands and face and ulcers of the foot. The improvement was quite distinct and in some instances the lesions actually disappeared. Photographs taken before and after the course of treatment show the changes quite clearly. Strange to say, however, smears from the lesions showed no significant changes in the bacterial content in many, though one *might* find disappearance of the leprous tissue accompanied by reduction in the number of bacteria and changes in their form. Patients kept under observation for as long as 4 years after the treatment was begun did not, except in one case, show any relapse in the area radiated, if the dose had been fairly large (5,000–10,000 r.), but new lesions might appear in their vicinity and elsewhere. *H. Harold Scott*

Aparisi Jijon, T. Nota previa del tratamiento de los lepromas recidivantes, epiesclerales y esclerales. [**The Treatment of Relapsing Episcleral and Scleral Lepromata : a Preliminary Note.**] *Rev. "Fontilles"*. Valencia. 1948, Jan., v. 2, No. 1, 46–7.

Hingson, R. A., Johansen, F. A., Erickson, P. T., Elliott, D. E., Meyer W. H., Fite, G. L., Wolcott, R. R. & Prejean, B. H. **Preliminary Study of the Hypospray for Parenteral Therapy in its relation to the Management of Leprosy.** *Internat. J. Leprosy.* 1948, Apr.–June, v. 16, No. 2, 173–8, 7 figs. on 2 pls.

This paper describes and illustrates an instrument for injecting solutions (promin, procaine, antibiotics, etc.) under a pressure of 125 pounds of spring pressure through an orifice 0·003 of an inch in diameter—$\frac{1}{137}$ the size of a 26-gauge hypodermic needle and approximately that of the proboscis of a mosquito—the solution leaving the orifice at a velocity of approximately 600 miles an hour, or about twice the necessary pressure for such a fine jet to pierce the skin and subcutaneous fat. The advantages claimed for it are absence of or greatly diminished pain on injection of various solutions; sterilization is unnecessary on account of preparation of the "metapules" which hold the solution; and painlessness prevents children fearing the injections. The time of multiple sterilizations is saved, so that prolonged daily injections of various preparations including promin is facilitated. It has also been used at Carville to afford instantaneous relief of nerve pains of leprosy by injection of procaine. The new instrument is not yet on general sale as further improvements are expected; packing of the drugs in the metallic containers is at present only done by the Scherer Corporation; but it is hoped to be able to make it a reasonable cost, as a single instrument will outlast several syringes and many needles. Two plates illustrate the instrument. *L. Rogers*

i. Leprosy Review. 1948, July, v. 19, No. 3, 86–109. **Fifth International Congress of Leprosy.** [Abstracts of Proceedings and Reports of Committees.]

ii. Internat. J. Leprosy. 1948, Apr.–June, v. 16, No. 2, 255–317. [**Summaries of Papers presented to the Fifth International Leprosy Congress, Havana, Cuba, Apr. 3–11, 1948.**]

i. This account records the conclusions of the committees which studied the evidence under different subjects in the various papers read at the Congress; it has been written by Dr. G. A. Ryrie, who attended the meetings.

Report of the Committee on Therapy.—Advances have been made owing to the use of sulphones and of increasing doses of hydnocarpus oil. The former are of great value in lepromatous cases of an advanced or moderately advanced type, especially with respect to lesions of the nose, throat and eyes, and they are the present drugs of election. The actions of promin, diasone and sulphetrone are equal bacteriostatically and the following dosage is advised. Promin is given intravenously each day for one to three months in doses (for adults) increased after one or two weeks from 2 gm. in 5 cc. of solution up to 12·5 cc. and resumed after one to two weeks' rest. Diasone is given orally on weekdays in doses of from 0·3 gm. daily, increased by 0·3 gm. each week for three weeks and subsequently to 1·8 gm. daily if well tolerated, with 1 to 2 weeks' rest every two months. Sulphetrone may be used by injection or orally to produce a concentration in the blood of 5 mgm. per 100 cc., for which purpose daily doses of 3 to 6 gm. orally are required in adults, beginning with 0·5 gm. three times a day increased by 0·5 gm. per day to the required amount. In children 1·5 to 3 gm. daily are recommended. A period of rest is advised after six months. Any resulting anaemia is treated by iron, vitamin B complex, liver extract and thiamin chloride. The occurrence of erythema nodosum or iritis indicates temporary suspension of sulphones. Haemotoxic or renal reactions should be watched for.

Many workers have found large and regular dosage of hydnocarpus oil or its derivatives to be effective, such as 15 to 25 cc. weekly, raised if it is well borne to 40 to 50 cc. per week. Some workers consider that the drug should be continued during reactions unless the eyes are affected. A period of rest may be advisable after every three and a half months' treatment. Supplementary surgical and other methods should also be used. Further research is advised on antibiotics and other new preparations, such as streptomycin and para-amino salicylic acid and on combinations of drugs. Sulphones should only be sold on medical prescription and it is hoped that their cost will be reduced.

Report of the Committee on Epidemiology and Control.—The difficulties of epidemiological enquiries are first stressed and the statistical control of clinical data collected over a number of years is advocated; a modified life table method should, if possible, be used to enable the magnitude of the problem in each area to be determined. In order to obtain uniformity various terms are defined. Under the heading of control, the Committee advised leprosaria of the agricultural colony type with separation of the infectious and non-infectious cases, and sanatoria for patients with personal financial resources, within easy communication of an urban centre and not on a small island. The soil should allow of agricultural activities and the capacity should not exceed 1,000 patients. Other recommendations are dispensaries and out-patient clinics; selection of cases for isolation and treatment; control of unisolated cases; removal of children of infective patients to preventoria; the control of contacts with re-examination every six months for five years from the last contact with an infectious case; and nurseries for newly-born infants of leprosy patients—all measures which have been repeatedly advised for a number of

years. Legal enactments should embody only general principles and regulations should be made by experts. Education of medical students and the general public on leprosy is required. The disease is frequently curable and only "open" cases need be isolated. The word "leper" should be avoided as much as possible. An appendix of recommended indices is added.

Report of the Committee on Classification and Nomenclature.—In an attempt to reconcile apparently discordant systems, classification should be based on clinical, bacteriological, immunological and histopathological data in diminishing order of availability. The "polar" forms are lepromatous and tuberculoid, to which should be added indeterminate (undifferentiated) or I. forms. The degree of severity, manner of evolution, localization, morphology and clinical form should also be recorded.

Report on the Words "Leper" and "Leprosy."—Cases should be designated "leprosy patient" and the term "leper" abandoned, but the former term should not be discarded. A social assistance programme should include provision for healthy children, assistance of families of leprosy patients, education of the patients and their rehabilitation on leaving leprosaria.

ii. This consists of summaries of 153 papers and titles of 43 other papers presented at the Havana Congress, classified by subjects essentially as in the session programmes and for the most part in the language of presentation. The language distribution is: Spanish 66, English 55, French 22, Portuguese 10. *L. Rogers*

Soares, J. A. Os dispensários na profilaxia de lepra. (Considerações referentes ao serviço de profilaxia da lepra, no estado do Espirito Santo, de 1927 a 1945.) [**Dispensaries in Leprosy Prophylaxis as exemplified in Spirito Santo, Brazil, between 1927 and 1945.**] *Rev. Brasileira Leprologia.* S. Paulo. 1948, Mar., v. 16, No. 1, 35–51, 5 charts. [17 refs.]

Professor de Souza-Araujo more than a quarter of a century ago stated the aims of dispensaries in dealing with leprosy, which included a census of sufferers from leprosy, epidemiological inquiries in leprosy foci, selection of cases for ambulatory, domiciliary or hospital treatment, etc.

A Leprosy Prophylactic Service was started in 1927 under the direction of Dr. Pedro Fontes; in 1928 a census was taken and by 1931 290 cases had been noted. By 1934, there were 8 dispensaries established in places where the incidence was highest. In 1936, a plan was evolved for centralizing and controlling the activities of these dispensaries, for attracting the infected, the suspected and their contacts for examination, re-examination and treatment; an Assistance Service for the patient and his dependants, for getting hold of vagrant patients and for educating the children. A colony was established in 1937 and two years later a home for the healthy children of leper patients. Next follows an account of the staffs of these several dispensaries and a table showing the distribution of 1,000 patients in the eight dispensary districts; of these, 256 are interned. Apart from the dispensaries at fixed places there is an itinerant service which pays periodic visits to other places and makes epidemiological investigations. *H. Harold Scott*

HELMINTHIASIS

Janssens, P. G. De "A.E.X." concentratie methode voor wormeneieren. [**The AEX Concentration Method for Worm Eggs.**] *Ann. Soc. Belge de Méd. Trop.* 1948, June 30, v. 28, No. 2, 213–20. French summary.

The author studied the use of the Acid-Ether-Xylol (AEX) concentration method for helminthic ova in faeces, a modification of the Telemann technique described by Loughlin and Stoll [this *Bulletin*, 1947, v. 44, 335].

Stool samples of 200 patients were examined by this method in parallel with direct microscopic examination.

The results, which include egg counts, species incidence, multiplicity of infections and relative proportions of eggs recovered are shown in a number of tables. The author found the AEX technique to be eight times as effective as the direct smear and recommends it for routine use.

H. J. O'D. Burke-Gaffney

EICHBAUM, F. W. Potenciação da ação vermicida do hexylresorcinol por detergentes. Experiências *in vitro* com Ascaris de porco. [**Effects of Detergents on the Vermicidal Activity of Hexylresorcinol. In vitro Experiments with Hog Ascaris.**] *Mem. Inst. Butantan.* 1947, v. 20, 203–18, 1 fig. English summary.

Three sets of tests were undertaken: (1) The vermicidal action of hexylresorcinol alone, of the detergents alone, and of the combination of the two in physiological saline, and in Tyrode's solution. (2) The synergistic activity of sodium anacardate and of the anacid fraction of cashew nut oil. By the "anacid fraction" is implied that part of the oil which remains after precipitation of anacardic acid by hydroxide of lead; its chief components are cardol and anacardol. (3) The influence of the presence of mucus on the vermicidal action of hexylresorcinol alone and with detergents. The following substances were used in the tests: 5 per cent. solution of hexylresorcinol; 5 per cent. aqueous solution of sodium anacardate; the anacid fraction of cashew oil (see above); 10 per cent. anacardol in alcohol; the oil itself, 10 per cent. in alcohol; sodium tetrahydro-anacardate, 5 per cent. in water; and the following sodium salts: ricinoleate, oleate, linoleate, stearate, and palmitate, all in aqueous solution, the first two 5 per cent., the third 1 and 2·5 per cent., the others 1 per cent. The effect on the worms, *Ascaris suis*, was watched through a glass-fronted apparatus.

The vermicidal effect of hexylresorcinol is enhanced by detergents in certain proportions, but if the latter are high the effect is, in part at least, inhibited. Sodium anacardate, anacardol, the anacid fraction and a tincture of the oil enhance the action, especially the first and third of these. The first and last are fairly powerful vermicides themselves.

In Tyrode's solution, the effectiveness is lowered, owing to the formation of insoluble Ca and Mg salts. Mucus inhibits the anthelmintic activity of hexylresorcinol, but very slightly if detergents are present. *H. Harold Scott*

LEÃO, A. T. & EICHBAUM, F. W. Ação vermicida do óleo de cajú (*Ancardium occidentale*) e derivados. Experiências em cães. [**Vermicidal Activity of the Cashew Oil** (*Anacardium occidentale*) **and Derivatives. Experiments in Dogs.**] *Mem. Inst. Butantan.* 1947, v. 20, 13–30. English summary.

More than a century ago, in 1836, DUCHESNE recorded the use of Cashew oil, *Anacardium occidentale*, in helminthiasis, and Eichbaum (*Nature*, 1946, Apr. 6, 449) the vermicidal action *in vitro* of anacardic acid, one of the constituents of the oil. The oil is contained in the pericarp. The present paper reports the results of giving the oil to infested dogs. Twenty-six dogs were used for these experiments and the infections were by *Ancylostoma caninum*, *Toxocara canis*, *Trichuris vulpis* and *Dipylidium caninum*. Four preparations of the oil were tested: sodium anacardate, an emulsion containing 20 per cent. of the pure oil and the crude oil itself, anacardic acid, and a mixture of cardol and anacardol. Tables are presented showing the details of all the experiments carried out, but these may be summarized by saying that the best results were

obtained with the pure oil. The drug was given in gelatin capsules each containing 1 gm., or by stomach-tube, and in doses from 2·5 to 8 gm. according to the weight of the animals. The results were confirmed by autopsies on the dogs treated. *A. caninum* was reduced by 96·8 per cent., *Toxocara canis* was completely eliminated after a single dose, *Trichuris vulpis* reduced by 77·3 per cent. There was no evidence of any pathological lesion of the stomach or intestinal mucosa, nor of the liver or kidneys ; elimination takes place by the kidneys and the larger bile ducts. *H. Harold Scott*

Goodliffe, F. A. & Blair, D. M. **Hatching Speed of Schistosome Miracidia.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1948, Sept. v. 42, No. 2, 205.

It is difficult to detect the actual emergence of miracidia of *S. haematobium* from their egg shells and the speed of this would appear to be very great.

The authors in Southern Rhodesia, studied the individual "frames" of a ciné film exposed during the act of hatching : an intact egg was found in one frame and an empty split egg shell, with the miracidium a short distance away, was found in the next. The act of emergence must have coincided with the instant when the film was not exposed to the light transmitted through the slide, namely the 1/48th of a second while the shutter was closed. The hatching took place at room temperature (about 72°F.). *H. J. O'D. Burke-Gaffney*

Short, R. B. **Hermaphrodites in a Puerto Rican Strain of** *Schistosoma mansoni*. *J. Parasitology*. 1948, June, v. 34, No. 3, 240–42, 1 fig.

Short records the finding of 13 hermaphroditic males of *S. mansoni* out of 35 which he examined. The worms were collected in Porto Rico, but the host is unknown. The female reproductive system in some of the specimens was more completely formed than in those described by Vogel [this *Bulletin*, 1948, v. 45, 93], whose examples appeared to lack vitelline ducts, oötype, Mehlis' gland or a female genital pore. Some of the Porto Rican specimens possess oviducts, oötype, Mehlis' gland, short uteri, main vitelline ducts and vitellaria in different stages of completeness, in addition to well developed ovaries. In three specimens a female genital pore is present. Where this is easily visible, the male and female ducts unite at or close to the opening which thus may be regarded as a common genital pore. In one specimen, which is figured, there is a complete set of female organs which, however, are not quite typical and the vitellaria are not well formed. No eggs were present either in the uterus or oötype of any specimens, but in one the vitelline ducts contained a few vitelline cells. The seminal vesicles rarely contained spermatozoa, and these were usually in very small numbers. In four worms, the testes were reduced (in two cases, to three in number). *J. J. C. Buckley*

Papirmeister, B. & Bang, F. B. **The In Vitro Action of Immune Sera on Cercariae of** *Schistosoma mansoni*. *Amer. J. Hyg.* 1948, July, v. 48, No. 1, 74–80, 4 figs. on 1 pl.

Using sera from monkeys experimentally infected with either *S. mansoni* or *S. japonicum* and sera from three human patients, each infected with either *S. mansoni*, *S. japonicum* or *S. haematobium*, the authors demonstrated the formation of a precipitate around the cercariae of *S. mansoni* acquired from the snails *Australorbis glabratus*.

Cercariae were exposed, within 1 hour of being concentrated or a maximum of 3 hours after leaving the snails, in a physiological saline suspension and a

1 in 2 dilution of serum. At room temperature the precipitate was formed around the tail of the cercaria in about one hour, after which movement became sluggish, and within 3 hours the body was also surrounded. No precipitate was formed with control cercariae in normal sera and these survived longer, and in contrast with the cercariae in the immune sera they usually shed their tails. In a very high percentage of the cercariae exposed, the precipitate was formed in both the monkey and human immune sera. The highest titres and most extensive precipitate were produced by two monkeys recently infected with *S. mansoni* and by the recently infected patient (*S. japonicum*). The lowest titres were obtained in 8 monkeys infected with *S. japonicum* which were lightly infected and whose infection was of 2 to 2½ years' duration. The sera of only 3 of these 8 monkeys produced precipitate *without* the addition of guineapig complement (unheated guineapig serum diluted 1 in 10). Heating the positive sera in a water bath at 56°C. for half an hour destroyed the ability to produce precipitate, but the addition of guineapig complement restored it in every case. *J. J. C. Buckley*

LEVINE, M. D., GARZOLI, R. F., KUNTZ, R. E. & KILLOUGH, J. H. **On the Demonstration of Hyaluronidase in Cercariae of** *Schistosoma mansoni*. *J. Parasitology*. 1948, Apr., v. 34, No. 2, 158–61, 2 figs.

The fact that hyaluronidase, an enzyme capable of disaggregating and depolymerizing hyaluronic acid, has been demonstrated in numerous bacterial organisms and has been shown to be a mechanism whereby these organisms spread in skin, suggested the possibility that this enzyme might well be involved in the mechanism of cercarial penetration of skin. A technique is described in which the hyaluronidase activity of cercariae of *S. mansoni* in suspensions prepared with sodium hyaluronate, was tested. Considerable activity was demonstrated, although there was no relationship between the number of cercariae used and the activity.

The authors do not hold that this ability of *S. mansoni* cercariae is entirely responsible for the phenomenon of cercarial penetration and remark that collagenase or proteolytic enzymes might also be present, but these have not yet been investigated. *J. J. C. Buckley*

GELFAND, M. **Bilharzial Disease of the Bladder as determined at Autopsy, with particular reference to its Diagnosis by Mucosal Snips.** *Amer. J. Trop. Med.* 1948, July, v. 28, No. 4, 563–6.

The author classifies the macroscopic lesions of the bladder found at autopsy in *S. haematobium* infections into (1) whitish tubercles, varying in number and from 0·5 mm. to 2 mm. in size, seen mostly on the fundus, (2) greyish-yellow or reddish brown "sandy" patches of similar distribution, but later in appearance and (3) reddish warty papillomata, seen usually in the fundus and apex in about 8 per cent. of cases. He refers to the general impression held by many authorities that macroscopic lesions may be expected if ova are deposited in the bladder, and that a normal naked-eye appearance of the bladder excludes schistosomiasis.

In the present study, the author, in S. Rhodesia, examined the bladder macroscopically at autopsy in 50 consecutive cases of vesical schistosomiasis and then digested each whole bladder in 10 per cent. caustic potash at 60°C. for 10 hours. The centrifuged digest was then examined for ova. (In S. Rhodesia the disease may be considered to be well established by the time adult life is reached: the patients in this case were Africans of 20 to 50 years.)

In the 50 cases, 34 (68 per cent.) showed macroscopic lesions, as defined above : in 16 (32 per cent.) no macroscopic abnormality was found, but ova were detected, on digestion of the specimens. It is thus clear that the bladder may be diseased, even if cystoscopy shows no abnormality.

The author then refers to the work of OTTOLINA & ATENCIO [this *Bulletin*, 1944, v. 41, 945 and HERNANDEZ MORALES & MALDONADO [*ibid*, 1947, v. 44, 330] on rectal biopsy in the diagnosis of *S. mansoni* infections. He himself has been able to demonstrate positive biopsy snips in most of those passing ova in their stools ; he has also been able to diagnose *S. haematobium* by biopsy in about 40 per cent. of cases [paper in publication].

He also took snips about 2–3 mm. in size from 10 bladders, apparently free from lesions macroscopically : nine of these were positive for *S. haematobium*. He therefore recommends that should a bladder appear to be normal on cystoscopic examination for evidence of schistosomiasis, a snip of the mucosa should be examined for ova, since the disease cannot otherwise be excluded. [The author refers to a paper by himself in 1947, now under publication : but there is no reference to the paper by MEESER, ROSS & BLAIR, also in S. Rhodesia, on the diagnosis of rectal schistosomiasis, which includes rectal biopsy (this *Bulletin*, 1948, v. 45, 794).] *H. J. O'D. Burke-Gaffney*

ERFAN, M. **Pulmonary Schistosomiasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1948, Sept., v. 42, No. 2, 109–13. [14 refs.] Discussion 113–16 [MANSON-BAHR, P. ; TIDY, H. ; DAY ; CHESTERMAN, C. C. ; ALVES ; ERFAN].

Lung infection in schistosomiasis occurs early, when the cercariae are migrating, and later if there is lodgement of ova and worms in the lungs. In Egypt, 60 to 70 per cent. of the population harbour schistosomes ; of these a third suffer from secondary pulmonary schistosomiasis. The disease is one of agricultural workers ; its greatest incidence is in children and young adults, males preponderating.

Ova and worms reach the lungs embolically from veins in the urinary or intestinal tracts ; they travel by the internal iliac veins, and through the porto-caval anastomoses respectively. *S. haematobium* ova are more commonly found in the lungs than those of *S. mansoni*. The ova cause two types of lesions, parenchymatous and arterial. On escaping from the lung arterioles into the adjacent tissue they are surrounded by histiocytes and eosinophiles, then by lymphocytes and a few giant cells, and fibroblasts finally form a nodular scar. These parenchymatous lesions occur around the bronchioles and alveoli, but cause little change in the finer structure of the lungs. The arterial lesions, usually due to the ova of *S. mansoni*, though less common, are more serious. They are caused by the passage of ova through the arteriolar walls, with scarring and atresia or occlusion of the vessels. Occluded vessels may be canalized, with the formation of angiomatoids. If the vascular lesions are numerous the right ventricle dilates, hypertrophies, and finally fails. In the early stage, miliary bilharzial tubercles can be seen microscopically in clusters, or arranged in lines, around the thickened arteries. Later the tubercles vanish, and only the thickened dilated vessels are to be seen. The pulmonary artery and its primary branches may be greatly dilated, and their walls show atheromatous changes ; in their lumina there may be ante-mortem thrombi. The right ventricle is dilated and hypertrophied, its wall being 1 cm. or more in thickness. There may be schistosomes in vessels in the lungs ; though they are harmless when alive, on dying they cause a necrotic focal pneumonia evident, at postmortem, as opaque white areas of consolidation 0·1 to 0·5 cm. in diameter. The arteriolar involvement gives rise to a condition resembling Ayerza's disease, or primary pulmonary endarteritis ; but cyanosis, the most

striking feature of this disease, is noticeably absent in pulmonary schistosomiasis until the right ventricle fails. Radiologically, in early cases, the nodules can be seen along the ramifications of the pulmonary artery; later, these increase in number, the hilar shadows increase, and the subaortic notch is obliterated; in very advanced disease the hilar shadows are further increased, and the pulmonary artery and conus are greatly enlarged, reaching aneurysmal size and masking the aorta. The heart develops the appearance of *cor pulmonale*.

A specific diagnosis of pulmonary schistosomiasis rests on discovery of ova in the sputum, but they are rarely found. Establishment of the presence of the primary infection is essential, and clinical examination of the lungs is of little help. Clinical and radiological examination of the heart is important. Eosinophilia is more pronounced in cases with lung involvement.

Two per cent. of those suffering from schistosomiasis die from right ventricular failure as a result of pulmonary arterial disease. This failure occurs late, its causation being mechanical rather than myocardial. Treatment with antimony should be given early, before there is enlargement of the right ventricle; in cases with right ventricular failure, antimony is contra-indicated. The heart failure is treated along the usual lines with digitalis, venesection, and mercurials.

In the discussion which followed the lecture, Sir HENRY TIDY praised the advances made by the Egyptian workers in the study of schistosomiasis during the last 20 years; the recognition of pulmonary and hepatic bilharzial disease was largely due to them. Ayerza's disease, according to the textbooks, is characterized by deep cyanosis due to sclerosis of the pulmonary artery and probably is syphilitic in origin. The best recent description of the pathology of the condition has been given by CHENEY in America. There appears to be no essential difference between his illustrations of the arterial changes, and those reproduced from cases of pulmonary schistosomiasis in Egypt. Many cases of Ayerza's disease come from mining areas in high altitudes in S. America. On bringing these patients to low altitudes (such as obtain in Egypt) the cyanosis diminishes. There is no adequate ground for considering syphilis a causative factor in this condition; and the name should be restricted to the particular syndrome in S. America, and not be applied to every case of pulmonary arteritis with death in cardiac failure.

The intensive courses of antimony treatment advocated by Blair and Alves should be used with caution. There have been reported some bad reactions in S. Africa, and even more severe in Egypt. The S. African patients, apart from their schistosomiasis, were healthy, but in Egypt hookworm and other infections are ubiquitous.

Prof. DAY referred to Looss's fear that when specific treatment for schistosomiasis was found the resultant verminous thrombophlebitis might be worse for the patient than the parasitic infestation. He had observed a remarkable degree of necrosis and infiltration around dead worms in the liver, a condition which resembled that depicted in recent papers on filariasis. Similar reactions may well occur in the lungs. The proportions of cases of lung involvement due respectively to embolism of ova and to actual worm infestations have yet to be decided. A pulsating shadow in the hilar region around the heart, if it were to be seen on screening and were due to incompetence of the pulmonary valves, might be of diagnostic significance.

Dr. C. C. CHESTERMAN referred to the complications, including pulmonary symptoms, due to *S. intercalatum* infestations to which he drew attention 25 years ago. He agreed with the opinion that there are possible dangers in too energetic treatment with tartar emetic; for example, pulmonary tuberculosis may be activated.

Mr. ALVES stated that after concentration with KOH very scanty ova in the sputum may be revealed. There may be racial differences in the susceptibilities of Bantu and Egyptian to antimony, but schistosomiasis in Egypt is clinically a much more severe disease than elsewhere in Africa. The radiological recognition of pulmonary schistosomiasis in S. Rhodesia is complicated by the prevalence of silicosis and tuberculosis, both of which it resembles.

Prof. ERFAN in reply said that the intensive antimony treatment in Egypt produces severe, and often serious, general reactions. He agreed with DAY that hilar pulsations may be seen in cases of interatrial septal defect, but they are not marked in bilharzial pulmonary arterial disease as the vessels are atheromatous and rigid. *A. R. D. Adams*

HASHEM, M. **The Incidence of Non-Schistosomal Forms of Hepatic Cirrhosis in Egypt. Their Morphology and Pathogenesis.** *J. Roy. Egyptian Med. Ass.* 1948, Mar., July & Aug., v. 31, Nos. 3, 7 & 8, 222–9; 541–55; 635–50, 17 figs. on 9 pls. [32 refs.]

MAUSS, H. Ueber basisch substituierte Xanthon- und Thioxanthon-Abkömmlinge; Miracil, ein neues Chemotherapeuticum. [**Miracil, a New Chemotherapeutic Agent.**] *Chem. Berichte.* 1948, Jan., v. 81, No. 1, 19–31. [Refs. in footnotes.]

CAWSTON, F. G. **Criteria of the Cure of " Bilharziasis ".** *J. Trop. Med. & Hyg.* 1948, Sept., v. 51, No. 9, 184.

The author lists certain points to be observed in assessing cure of schistosomiasis [though not giving much clinical or any statistical evidence in support of them]. Failure to hatch is no evidence that female adult worms are dead and treatment should be continued for a week after ova have ceased to appear. If total dosage is inadequate, ova tend to reappear at the end of six weeks.

The author has cured a case in 22 days with a total of 50 cc. of anthiomaline in doses up to 4 cc. intravenously five times a week, without causing more than the slightest cough. He considers this to be a minimum period of cure.

Degeneration of adult worms may be estimated by the gradually increasing proportion of dead and degenerating ova in the excreta, after 10 days. The first sign of drug effect is a slightly increased transparency of the egg shells, associated with increased activity of the contained miracidia or the presence of ill-formed ones. It is stated that some ova later are seen to be black without trace of a miracidium, especially where antimony or benzoic acid is being administered. This the author attributes to the entry of blood through the egg shells damaged by the drug. A further indication of the death of the adult worms is a temporary rise in the eosinophile count a few days after the start of treatment: this nearly always returns to normal two months after the death of all the adult parasites. *J. H. O'D. Burke-Gaffney*

FAUST, E. C. & BONNE, C. **Mammalian Blood Flukes of Celebes.** *J. Parasitology.* 1948, Apr., v. 34, No. 2, 124–31, 12 figs. [14 refs.]

The circumstances of the discovery of a focus of *Schistosoma japonicum* and of *Echinostoma lindoensis* in 1936 in the Lake Lindoe region of the Celebes [this *Bulletin*, 1938, v. 35, 218] are reviewed by the authors. In the present communication the earlier data are amplified and more detailed morphological facts are presented. In the advanced stages, schistosomiasis in the inhabitants of Lake Lindoe villages presents the classical clinical picture of splenomegaly, hepatic cirrhosis, ascites and emaciation. Adult worms obtained from human, canine and cervine hosts were examined in detail and shown to be morphologically identical with *S. japonicum*. A collection of snails made in the Lake Lindoe region contained no *Oncomelania*.

Reference is also made to an expedition in 1941 to Lake Poso, 100 kilometres to the south-east of Lake Lindoe [this *Bulletin*, 1942, v. 39, 628, 629]. No human, or animal infections with schistosomes were found there, nor were any snails of the genus *Oncomelania* discovered, but from a single specimen of *Lymnaea* sp. furcocercous cercariae were obtained. The morphology of these is described and also that of immature flukes obtained as a result of exposing rats and mice to the cercariae. Although these worms are believed to belong to the genus *Schistosoma* rather than *Schistosomatium*, it is concluded that they are not *S. japonicum*. *J. J. C. Buckley*

Li, Fu Ching. Zur Frage der Schistosomiasis Japonica und ihrer Bekämpfung in China. [*Schistosomiasis japonica* **and the combating of it in China.**] *Chinese Rev. Trop. Med.* 1948, Jan., v. 1, No. 1, 15–28, 2 figs. (1 folding). [23 refs.]

This article is divided into three main sections. The first speaks of the worm itself, its discovery, life-history and its presence in China. The second of its epidemiology in China, especially in Kiangsu and Chekiang provinces and in 9 districts, but hardly any figures are given, merely averages and extremes for certain areas and sub-districts, and the same for the percentages of infected *Oncomelania* found, varying from 1 to 16; the totals examined on which these percentages are based are rarely stated.

Among 37 districts more than half the people are infected (55·6 per cent.) in the heavily infected and as much as 39·6 per cent. in the more lightly infected. Of over 12 million inhabitants of these districts 80 per cent. are peasants and 47·4 per cent. of them suffer from schistosomiasis, a much higher proportion than in Japan itself, where, the author states, among 1½ million persons [where?] only 5·3 per cent. are infected. As regards sex, the inferences drawn have little validity because the numbers are small: of 423 adult males, 153 were infected (36·1 per cent.), of 86 women 12 (14 per cent.); of 81 boys 18, and of 19 girls 5 were infected; also the figures of the females are erroneous, "from modesty" they are averse to consulting a doctor. The third section deals with the measures to combat the disease. These are on the usual lines: drying the canals to kill the snail vector, the use of toxic substances in the water, proper provision for excreta disposal, treatment of patients and explanatory propaganda among the people. *H. Harold Scott*

Pitner, G., McNamara, W. L. & Gogolak, F. M. **Parasitologic Studies of World War II Veterans, with special reference to Schistosomiasis Japonica.** *Amer. J. Clin. Path.* 1948, Aug., v. 18, No. 8, 632–4.

In order to detect asymptomatic and sub-clinical schistosomiasis, the stools of 130 patients in a Veterans Administration hospital who had definite histories of exposure to fresh inland water in an area endemic for schistosomiasis (*japonicum*) were examined repeatedly by five different methods, namely:—

(1) Direct smear, pieces of mucus being selected if possible.
(2) Acid-ether concentration technique.
(3) Sedimentation after comminution in 25 parts of 0·5 per cent. glycerin in tap water and filtration through wet gauze, the process being repeated several times.
(4) Egg-hatching technique; with examination for miracidia with a hand-lens.
(5) Combined screening and sedimentation technique, by filtration through 100-mesh wire cloth (openings 150μ) and then through 400-mesh (openings 37μ).

In addition, Faust's zinc sulphate centrifugal flotation method for protozoa and other ova was used as a routine.

The findings were as follows :—*Schistosoma japonicum* ova were found in 5 patients, hookworm ova in 44, *Trichuris trichiura* ova in 34, *Ascaris* ova in 3, *Hymenolepis nana* ova in 1, *Trichostrongylus* ova in 3, *Strongyloides* larvae in 1 and *Entamoeba histolytica* in 18. *L. E. Napier*

TARR, L. **Effect of the Antimony Compounds, Fuadin and Tartar Emetic, on the Electrocardiogram of Man ; a Study of the Changes encountered in 141 Patients treated for Schistosomiasis.** *Ann. Intern. Med.* 1947, Dec., v. 27, No. 6, 970–88, 5 figs. [13 refs.]

Heart failure and death have been reported as a result of trivalent antimony injections, but no significant electrocardiographic changes had been reported prior to MAINZER and KRAUSE's paper [this *Bulletin*, 1940, v. 37, 487].

The present study was made on a series of 200 patients with schistosomiasis (*japonicum*), service men infected in Leyte. A preliminary report on 66 of these cases has already been published [this *Bulletin*, 1946, v. 43, 657]. " The first 141 patients to be treated form the basis of this report ". The readings were taken under standard conditions, one hour after an injection, at different times during the course of injections, *e.g.*, after 5 ml., 45 ml., 65 ml., 80 ml., 105 ml., of 6·0 per cent. fouadin and after 80 ml., 248 ml. and 320 ml. of 0·5 per cent. tartar emetic, but some variations were made and additional readings were taken in special cases. With the preliminary controls, a total of 900 electrocardiograms were taken and read by one observer.

The alterations were for the most part confined to the T-waves. Changes were observed in 133 patients of whom 98 per cent. showed involvement of 3 or 4 leads. Three-plus or four-plus changes occurred in 4 of 48 patients on fouadin and in 30 of 98 patients on tartar emetic. These changes were defined by the author as follows :—

" Three plus change was a continued decrease in the height of the T-waves to extremely low voltage or isoelectric levels in three or more leads, accompanied by a slight negativity of the terminal portion in one or more of the leads. The summits of the waves presented no sharp angles, but were rounded or flattened.

" Four plus change represented an alteration from positive T-waves to sharply negative or even cove plane T-waves in three or more leads, with low voltage in the remaining lead."

Generally, the changes varied in degree with the total dosage, but there were considerable individual variations ; in some cases changes were noted after minimal dosages, whereas in others no changes were noted with large dosages. If however an alteration was noted early in the course, this alteration either remained throughout or more usually was intensified. Four-plus alterations were noted after 176 ml., 200 ml., 320 ml. or 416 ml. of tartar emetic and after 80 ml. of fouadin. Greater alterations were observed after tartar emetic than after fouadin, but the alterations were of the same nature. Some change was noted in every patient with the former drug.

When a second course of injections was given the alterations occurred again and were usually of the same degree : further, if a tartar-emetic course was given after an initial fouadin course, the alterations were of the same degree or were intensified.

The changes were reversible. After the completion of the course they increased in some cases for a few days and then decreased steadily and were absent 30 to 60 days later in 90 per cent. of cases ; in the remaining 10 per cent. minimal alterations still remained.

The changes in their most marked form might have been interpreted as showing evidence of myocardial degeneration. There was in no case any clinical evidence of cardiac dysfunction.

The author concluded that the alteration was brought about by the deposition of antimony in the heart muscle. " The changes induced were of such definite and distinct pattern that in the more marked alterations they may, within the limitation of our present knowledge, be recognised as a specific effect of antimony."

L. E. Napier

OLSEN, O. W. **Wild Rabbits as Reservoir Hosts of the Common Liver Fluke, *Fasciola hepatica*, in Southern Texas.** *J. Parasitology.* 1948, Apr., v. 34, No. 2, 119–23. [18 refs.]

For the purpose of estimating the importance of wild rabbits as natural disseminators of the common liver fluke, post-mortem examinations were carried out on 309 jack-rabbits, *Lepus californicus merriami* and 24 cottontails, *Sylvilagus floridanus* subsp. which were collected in the Gulf Coast region of Texas. Infection with *Fasciola hepatica* was found in 32 per cent. of the jack-rabbits and in 20·8 per cent. of the cottontails. The flukes were usually located in the common bile duct where they caused extreme hypertrophy of the duct walls, resulting in extensive malformation. The number of flukes in the jack-rabbits ranged from 1 to 7 per animal ; 3 flukes were found in one cottontail.

The literature dealing with records of *F. hepatica* in rabbits and hares is reviewed, and the rôle played by these animals in maintaining the infection and disseminating it to domestic ruminants is discussed.

J. J. C. Buckley

DA FONSECA, F. & DE AZEVEDO, J. F. Un cas humain de fasciolase hépatique. [**A Human Case of *Fasciola hepatica* Infection.**] *Ann. Parasit. Humaine et Comparée.* 1948, v. 23, Nos. 1/2, 18–22.

The authors discuss the world incidence of *Fasciola hepatica* infections in man and quote a number of figures taken from the literature. They are not aware of any reported cases of this infection in continental Portugal or its neighbouring islands [but cases have recently been described from Spain, see this *Bulletin*, 1948, v. 45, 197]. They then describe in detail the case of a man of 31, born and bred in Funchal, Madeira, who had paid his first visit to the mainland in November 1947. He then gave a history of one year's gastro-intestinal disturbances, with loose stools twice daily, backache, malaise, night sweats and abdominal fulness. On examination, the abdomen proved to be full and tender, especially along the course of the colon. The liver was a little hard and tender and the spleen was enlarged. The blood picture showed a persistent eosinophilia of 34 to 50 per cent. On the ninth day of observation the patient developed an urticarial eruption on the hands, neck and abdomen. Laboratory examinations were largely uninformative, except that in the stools *E. histolytica* (vegetative forms) were found, together with eggs of *Fasciola hepatica, Ascaris lumbricoides* and *Trichuris trichiura*. The first-named eggs were also found in specimens of bile.

Diagnosis was first suggested by the eosinophilia, which led to the finding of the ova in the stools and bile. The eggs were morphologically typical.

The patient was given to the frequent consumption of raw watercress and lettuce, and it is presumed that the former was the likely vehicle of infection

with metacercariae. This aquatic plant is eaten frequently by the people of Madeira, so that more cases of this infection may arise. The authors consider that a thorough investigation of this question should be made.

They are attempting to establish the complete developmental cycle of the fluke from the eggs passed in the stools and will publish their findings later.

Treatment with emetine has been given, in order to deal with the amoebic infection also: the authors are awaiting the results of this treatment. [Although there is no doubt of the infestation in this case, the question of clinical infection is masked by the presence of the accompanying *E. histolytica* and two other parasites: and this same difficulty will complicate interpretation of the results of emetine treatment.] *H. J. O'D. Burke-Gaffney*

Cacciapuoti, R. Su di una nuova distomiasi umana in Etiopia. [**A New Distome found in Man in Ethiopia.**] *Riv. di Biol. Colon.* Rome. 1947, v. 8, 111–16, 1 fig. [12 refs.]

The trematode described was found by chance when the author was performing an autopsy on a man from Beghemeder, Italian Ethiopia, in 1941. It was present in small cyst-like nodules the size of a pea or a cherry-stone in the small intestine. The mucosa there was congested. The nodules were firm but elastic with contents of serum, pus and blood and many small distomes. None was found in other parts of the intestine, nor in liver, spleen or lung. Specimens were sent to the Director of the Zoological Institute of the University of Naples, who stated that it was a new species of *Pseudoamphistoma*. The author points out its differences from Luehe's first description of this genus and from the known species *P. truncatum* found in the liver by Vinogradoff, and *P. danubiense* found in a cat by Ciurea in 1913. One marked difference is in its having a smooth cuticle. The testes are very large and the mature worm shows a medial laceration due, it is thought, to the rupture of a cyst containing large numbers of ova, whence they may pass to the intestine and are excreted to infest sweet-water fish and crustacea. For more minute details the original should be consulted. *H. Harold Scott*

Bonne, C., Bras, G. & Lie Kian Joe. **Five Human Echinostomes in the Malayan Archipelago.** *Med. Maandblad.* Batavia. 1948, June 1, No. 23, 456–65, 9 figs on 2 pls. [14 refs.]

Echinostome material collected at human autopsies in the Malayan Archipelago before, during and after the war was restudied and five species were recognized. These are described and figured together with notes on their reservoir hosts, life-cycles and transmission.

1. *Euparyphium ilocanum* (Garrison, 1908). Frequently found in the small intestine of mentally abnormal persons in Java and also in normal persons. Over 250 specimens have been collected from a single patient. Main reservoir host, the common field rat, *Rattus rattus brevicaudatus*. First intermediate host, *Anisus convexiusculus*; second intermediate hosts, *Viviparus javanicus, V. rudipellis, Pila conica, Lymnaea rubiginosa, Anisus convexiusculus* and *Contradens contradens*.

2. *Echinoparyphium recurvatum* (v. Linstow, 1873). Found several times along with the previous species in a rural colony near Batavia. Main reservoir host, *Rattus rattus brevicaudatus*; fowls are also natural hosts. First intermediate host, *Anisus convexiusculus*; second intermediate hosts, *Viviparus javanicus, Lymnaea rubiginosa, Anisus convexiusculus* and *Contradens contradens*. Feeding experiments gave positive results in pigeons, rats and a cat.

3. *Euparyphium malayanum* (Leiper, 1911). In the Malayan Archipelago, this has only been met with in Northern Sumatra where 750 specimens were recovered from a 12-year-old Batak girl at post-mortem. Reservoir and intermediate hosts unknown.

4. *Echinostoma revolutum* (Froelich, 1802). Seen several times in Java in ducks, fowl and in rats. Twice found as a single specimen in Batavia in post-morterms on Indonesians and 85 specimens were once found in an Indonesian boy of 8 years. First intermediate hosts, *Lymnaea rubiginosa* and *Anisus convexiusculus*; second intermediate hosts, *Viviparus javanicus*, *Pila conica*, *Lymnaea rubiginosa*, *Anisus convexiusculus*, *Corbicula rivalis* and other *Corbicula* spp. Feeding experiments positive with pigeons and white rats.

5. *Echinostoma lindoensis* (Sandground & Bonne, 1940). Originally described from a heavily-infected tribe on the shores of Lake Lindoe in Central Celebes. In one village 96 per cent. of the people were infected. No natural reservoir host has been found, but feeding experiments were positive in rats and in a few cases pigeons and young ducks. First intermediate host, *Anisus sarasinorum*. Second intermediate hosts, *Viviparus rudipellis*, *Corbicula lindoensis*. *C. lindoensis* is an important article of diet in the Lake Lindoe villages, where it is cooked in a primitive way.

It is remarked that of the five species occurring in man, only *Echinostoma lindoensis* is specially adapted to the human host; the others are regarded as incidental human parasites whose normal hosts are rats and birds. Regular consumption of snails and mussels is the custom only in the poorer districts where the cooking process is not very thorough. [See also this *Bulletin*, 1940, v. 37, 491; 1942, v. 39, 629; 1947, v. 44, 1013.] *J. J. C. Buckley*

GALLIARD, H. Infestation naturelle des batraciens et reptiles par les larves plérocercoïdes de *Diphyllobothrium mansoni* au Tonkin. [**Natural Infestation of Amphibians and Reptiles by Plerocercoid Larvae of *Diphyllobothrium mansoni* in Tonking.**] *Ann. Parasit. Humaine et Comparée*. 1948, v. 23, Nos. 1/2, 23–6.

Sparganosis, or infection with plerocercoid larvae of *Diphyllobothrium mansoni*, occurs in mammals, birds, reptiles and amphibians in Indo-China. The author investigated the incidence and intensity of the infection in the more commonly infected animals in Tonking. *Rana tigrina* has the highest incidence, of 60 per cent. (annual mean) and the infection has a seasonal variation. It is nearly absent in winter, strong in spring and intense in summer. The reason for this is not quite clear. The average number of plerocercoids is 20 per animal in the summer. In November and December it varies from 1 to 4 and in March from 2 to 6. The commonest site of infection is the thigh muscles which is the exclusive site in light infections. The abdominal wall comes next in importance and with increasing numbers of parasites the thorax and back are infected. Visceral infection was encountered only once and on one occasion the parasites were encysted, but still viable.

Rana limnocharis is the commonest amphibian host after *R. tigrina*, but its infection is usually light, varying from 2 to 6 parasites. *Rana guntheri* was not found infected and *Bufo melanostictus* only once out of 16 examined.

Amongst the reptiles, 15 out of 15 *Tropidonotus piscator* were found infected, the parasites being numerous under the skin and in the mesentery. Up to 80 parasites have been found in one animal. On the other hand, *Hypsirrhina enhydris* is rarely infected. *J. J. C. Buckley*

Deschiens, R. & Bablet, J. Sur deux cas d'enclavement appendiculaire d'anneaux de cestodes. [**Tapeworm Proglottides in the Appendix: an Account of Two Cases.**] *Acta Tropica*. Basle. 1948, v. 5, No. 3, 219–27, 4 figs.

The English summary appended to the paper is as follows :—

"The study of nine cases of acute appendicitis from natives in French Tropical Africa enabled the authors to demonstrate, in two cases, the presence of proglottids of *Taenia saginata*.

"The parasites were enclosed within the lumen of the appendix. It has been found possible to identify them on sections by their characteristic anatomy, and especially by the presence of chalk bodies in the peripheral parenchyma of the worms. The walls of the appendix were inflamed, as also the lymphatic follicles, the latter being on the point of becoming necrotic.

"The proglottids appear to have penetrated directly into the appendix, thus assuming the role of an enclosed foreign body."

Epstein, E. **Intra-Ocular Cysticercosis. Report of a Case.** *South African Med. J.* 1948, Oct. 9, v. 22, No. 19, 625–6, 1 fig.

Konstam, P. G. **Late Recurrence after Marsupialization of Echinococcus Cyst of Liver.** [Memoranda.] *Brit. Med. J.* 1948, Oct. 2, 647, 1 fig.

Suarez Melendez, J. Quiste hidático calcificado de hígado. Formas fistulizadas. [**Calcified Hydatid Cyst of the Liver, with Fistula.**] *Arch. Uruguayos de Med., Cirug. y Especialidades.* 1947, Sept., v. 31, No. 3, 157–62.

Vigil, E., Piñeyrua, J. & Diez, R. Hidatidosis cardiopericardica. [**Cardiopericardial Hydatid.**] *Arch. Uruguayos de Med., Cirug. y Especialidades.* 1948, Oct., v. 31, No. 4, 249–60, 6 figs.

Larghero Ybarz, P. Quiste hidático del pulmón. 40 observaciones personales. [**Forty Cases of Pulmonary Hydatid Cyst.**] *Arch. Uruguayos de Med., Cirug. y Especialidades.* 1943, Mar., v. 22, No. 3, 255–68.

Crusz, H. **On an English Case of an Intramedullary Spinal Coenurus in Man, with some Remarks on the Identity of *Coenurus* spp. infesting Man.** *J. Helminthology.* 1948, v. 22, No. 2, 73–6, 1 fig. & 1 pl.

This paper comprises a description and discussion of a coenurus which was removed from the spinal cord of a 14-year-old girl who had developed symptoms of paraplegia. The infection must have been incurred in Britain, probably in Wales during the period 1943–1945. From a reconstruction of the original appearance of the coenurus, which had been cut up after removal into 3 fragments, it is described as follows :—a distinctly trilobed vesicle containing 31 scolices ; the largest lobe of about 1 cm. long, containing 26 scolices in groups of 20, 4 and 2 ; the next, also about 1 cm. long, containing 5 scolices, in groups of 3 and 2 ; and the smallest lobe, 6 mm. long, being devoid of scolices. The cyst wall is very delicate and transparent and shows no signs of proliferation. From the morphology of the scolices and the hooks, it is concluded that the coenurus is immature but all the evidence points to its identification as *Coenurus cerebralis*.

The author reviews briefly the previous records and geographical distribution of coenurosis in man, in which 3 species have been implicated, namely, *C. cerebralis*, *C. serialis* and *C. glomeratus*. He comments upon the difficulty of identifying these species and discusses the validity of the different criteria,

morphological and otherwise, which have been employed by various authors in separating the species. The possibility is stressed that the coenuri of man may be all one and the same species, namely, *C. cerebralis*; that *C. serialis* may be merely a variety or physiological " strain " and that *C. glomeratus* may represent an immature form of *C. cerebralis*. [See also this *Bulletin*, 1942, v. 39, 631.] *J. J. C. Buckley*

Osimani, J. J. Parasitismo humano por *Dipylidium caninum* (Linneo 1758). [**A Human Infestation with** *Dipylidium caninum*.] *Arch. Uruguayos de Med., Cirug y Especialidades*. 1946, Aug., v. 29, No. 2, 171–6.

The English summary appended to the paper is as follows :—

" History is reported of an infant, 8 months old, parasitised by *Dipylidium caninum* (Linneo 1758), apparently without symptoms. The worm is evacuated by means of oral administration of both garlic and santonine. Considering the form of observation, the share of each remedy in the success of the treatment cannot be determined."

Bergeret, C. Quelques réflexions sur l'ankylostomiase. [**Some Observations on Ankylostomiasis.**] *Bull. Méd. de l'Afrique Occidentale Francaise*. 1947, v. 4, No. 2, 159–66.

The author considers that the ancylostome occupies a position of its own among the intestinal helminths on account of the organic disorders which it produces, directly by the toxic secretions and indirectly by the grave anaemia which is associated with it.

He draws attention to :—

1. The gross cardiac anaemia which causes dilatation associated with valvular bruits and true asystoles [" *véritables asystolies* "]. Histologically, there is parenchymatous myocarditis with hyperplasia and fatty degeneration of the fibres, and diffuse interstitial infiltration by lymphocytes, polymorphonuclears and fibrocytes.
2. The hepatic lesions—centrilobular and midzonal atrophic or fatty degeneration, contrasting with dilatation and congestion of the sinuses in the periportal region and hypertrophy of the Kupffer's cells with much ingested pigment—which are characteristically those associated with anoxaemia.
3. The importance of the haemoglobin factor, and the fact that even without dislodging the parasite—often a difficult task—it is possible to ameliorate the anaemia to a great extent by large doses of iron. *L. E. Napier*

Floch, H. & Camain, R. Sur un nouveau cas de pseudo-myiase rampante à *A. brasiliense* en Guyane française. [**A New Case of Creeping Eruption caused by** *Ancylostoma brasiliense* **in French Guiana.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 168*. 1948, Feb., 4 pp., 3 figs.

Crofton, H. D. **The Ecology of Immature Phases of Trichostrongyle Nematodes. I. The Vertical Distribution of Infective Larvae of** *Trichostrongylus retortaeformis* **in relation to their Habitat.** *Parasitology*. 1948, July, v. 39, Nos. 1/2, 17–25, 5 figs. [14 refs.]

Crofton, H. D. **The Ecology of Immature Phases of Trichostrongyle Nematodes. II. The Effect of Climatic Factors on the Availability of the Infective Larvae of** *Trichostrongylus retortaeformis* **to the Host.** *Parasitology*. 1948, July, v. 39, Nos. 1/2, 26–38, 6 figs. [21 refs.]

HOAT, O. D. Iets over de overbrengers van de microfilaria malayi in het geneeskundig ressort Boven Mahakam. [**Vectors of *Microfilaria malayi* in Upper Mahakam.**] *Geneesk. Tijdschr. v. Nederl.-Indië.* 1942, Feb. 17, v. 82, No. 7, 302–6, 4 figs. on 1 pl.

The English summary appended to the paper is as follows :—

" Mansonia longipalpis, Mansonia annulatus and Mansonia indiana already known as vectors for filaria malayi in other parts of the Netherlands-East-Indies were proved to be responsible for the presence of filariasis malayi in the Upper Mahakam district of Borneo. A new carrier could be added : Coquillettidia crassipes, in which under experimental conditions a 26 per cent. proboscis infection could be obtained. Larvae of Mansonias and Coquillettidia's can be found attached to the roots of Eichhornia crassipes, but also of other kinds of swamp-plants with fluttering roots : Ipomoea reptans Poir (kangkoeng), Hygrophyla spec., Sparganophorus vaillantii Crantz."

GALLIARD, H. & NGU, D. V. Recherches sur la filariose. Choix d'une technique de numération des microfilaires du sang. [**Choice of Technique for enumerating Microfilariae in the Blood.**] *Ann. Parasit. Humaine et Comparée.* 1947, v. 22, Nos. 3/4, 158–63.

In endeavouring to discover the optimum procedure for estimating the number of microfilariae in blood, the authors established the following points :—

1. It is immaterial whether the blood be taken from the finger or the ear. 2. Peripheral blood is slightly richer in microfilariae than is blood taken from a vein. 3. Microfilarial counts in a large volume of blood are no more accurate than in a small quantity. 4. Microfilarial counts of haemolysed blood in a moist chamber gave better results than with thick stained films.

J. J. C. Buckley

HARTZ, P. H. & VAN DER SAR, A. **Tropical Eosinophilia in Filariasis. Occurrence of Radiating Processes about Microfilariae.** *Amer. J. Clin. Path.* 1948, Aug., v. 18, No. 8, 637–44, 4 figs. [19 refs.]

Enlarged lymph glands were removed from the anterior axillary fold of a woman, a native of Curacao. On gross section they were greyish red and showed numerous small yellow spots. On microscopic section, the general architecture of the gland was seen to be preserved. The lymphocytes in the lymphoid tissue were almost completely replaced by plasma cells between which were eosinophils in varying numbers. The yellow spots were areas of infiltration by eosinophils : these were seen in both cortex and medulla. The cells in the centre of these infiltrates were sometimes degenerated, but retained their eosinophilic character. The only other cells present were histiocytes with pale vesicular nuclei. Large numbers of eosinophils were present in the local blood vessels.

In many of the eosinophil infiltrates typical microfilariae were found. Many of these were surrounded by a homogeneous acidophilic membrane from which pseudopodic processes of various shapes and thicknesses radiated ; these were also acidophilic and " sometimes fairly refractile." Neither the membrane nor the processes stained with Weigert's fibrin stain.

A leucocyte count showed a total of 20,100 per cmm. with 23 per cent. eosinophils, 66 per cent. neutrophils, 4 per cent. lymphocytes and 7 per cent. monocytes. No microfilariae were found in the blood. A diagnosis of tropical eosinophilia was made. The patient was given two injections of mapharsen.

Five months later the leucocyte count was 11,300 with 4 per cent. eosinophils. She had no subjective symptoms and roentgenograms of the chest showed no abnormality.

The authors had observed these radiate formations and local eosinophil infiltrations in other instances of nematode infection, for example in a case of filarial epididymo-funiculitis and in strongyloidiasis. In both instances the worms were necrosing in the tissues. They consider that it is a non-specific allergic phenomenon in a sensitized person. *L. E. Napier*

Olivier, G. Etude critique des données nouvelles sur l'éléphantiasis. [**Critical Study of New Data concerning Elephantiasis.**] *Méd. Trop.* Marseilles. 1947, Nov.–Dec., v. 7, No. 5, 439–64, 9 figs. [64 refs.]

The author discussed the mechanism of the production of elephantiasis, using data of his own and of his colleagues.

An analysis of the oedema fluid and blood serum in elephantiasis showed that the protein content of the former was rather lower than one would expect in an inflammatory exudate and that in both the calcium was high. Further studies showed that it was mainly in the oedematous cases of elephantiasis that the serum calcium was high (mean 10·73 mgm. per cent.).

Whereas the serum calcium was normal in the sclerodermatous cases, analysis of the calcium content of the sclerodermatous skin showed that the average calcium content was increased by 85 per cent. These observations suggest that the fibrosis in the skin is due to impregnation with calcium.

The author points out that in the early stages when there is inflammatory oedema and sometimes osteoporosis the blood calcium is high, whereas later when scleroderma has developed there is often subjacent ossification and the serum calcium has returned to normal. He therefore believes that disturbance in calcium metabolism is a secondary phenomenon.

Lymphography of elephantoid limbs has confirmed the fact that there is dilatation and stasis in the lymph vessels of the limb, but has given no indication if this stasis is mechanical or functional, or whether the cause is regional or general: further, it has not actually been demonstrated that the obstruction is in the glands, though it is generally assumed that it is there. Phlebographic studies have shown that there is some associated venous congestion.

Sympathectomy produces a marked reduction in the size of the limb. This indicates that there is a functional element (spasm) as well as obstruction in elephantiasis. Parathyroidectomy causes a fall in blood calcium and has a transitory effect on the limb: in one case it caused a reduction in the size of the limb, but the tissues became hard and resistant.

In conclusion, the author considers that the mechanism of the production of oedema has still to be demonstrated before any effective treatment can be devised. *L. E. Napier*

Thetford, N. D., Otto, G. F., Brown, H. W. & Maren, T. H. **The Use of a Phenyl Arsenoxide in the Treatment of** *Wuchereria bancrofti* **Infection.** *Amer. J. Trop. Med.* 1948, July, v. 28, No. 4, 577–83. [13 refs.]

The substituted phenyl arsenoxides, as a group, have a markedly lethal action against the microfilariae of *Dirofilaria immitis* and *Litomosoides carinii in vitro*, and several of them kill the adult filariids when given in well-tolerated doses to their hosts. Arsenamide (*i.e. p*-(bis-(carboxymethyl-mercapto)-arsino)-benzamide) kills all the adult worms of *D. immitis* when given intravenously in daily doses of 0·23 mgm. As per kilogramme for two weeks, but does not produce an immediate reduction in the microfilaria count.

Seven patients with *W. bancrofti* infection were treated with this drug. It was given intravenously as a sodium salt in a 2 per cent. solution in buffered phosphate (*p*H 7·0) in daily doses of 0·05 ml. per kilogramme body-weight (=1·0 mgm. of arsenamide or 0·2 mgm. of As) for 15 days. Microfilaria counts were made before, during, and after treatment, the last counts being taken from 12 to 17 months after treatment. In six cases the pre-treatment counts were respectively, 307, 4, 726, 19, 150 and 143 microfilariae in 0·1 ml. of night blood. In each case, the microfilariae were practically eliminated by the end of treatment: in 3 cases very small numbers (1 to 3) were found during the follow-up, in one of these as late as the 17th month, but in all except this one the final count showed none. The treatment caused signs of slight toxicity in three cases, and febrile or local reactions in 4 others, the latter were probably due to the death of the adult worms.

In the 7th case no microfilariae were found at any time but the patient had overt signs of filariasis, and gave a positive skin test with dirofilaria antigen. After treatment there was a temporary improvement in the scrotal oedema, and the eosinophil percentage which had risen from 4 to 16 during treatment fell to nil in 100 white cells.

Two patients were treated with mapharsen (oxyphenarsine hydrochloride); one, an adult male negro aged 28, was given 0·06 gm. doses daily for 10 days. The microfilaria count fell from 360 in 0·1 ml. during the day and 14 during the night (he was a night worker) to nil two and three weeks after treatment. The other, a 23-year-old Porto Rican, was given 1·0 gm. by the constant drip method over a period of 5 days. His count fell from 4 to 5 microfilariae "per drop of freshly drawn night blood" to nil immediately after treatment and again in 3 and 28 months. In this second case, however, an adult filaria was removed by biopsy at the time the treatment was given.

The authors point out that the past failures with arsenical drugs have been associated with smaller dosages. *L. E. Napier*

KERSHAW, W. E. & BERTRAM, D. S. **Course of Untreated Infections of *Litomosoides carinii* in the Cotton Rat.** [Correspondence.] *Nature.* 1948, July 24, 149–50.

The authors urge that caution be used in interpreting the results of chemotherapeutical studies in filariasis, in which the experimental animals employed are cotton rats which have acquired their filarial infections naturally in the field. Their experience with cotton rats experimentally infected in the laboratory and observed for a year or more, shows that the duration and intensity of the microfilariae in the blood varies considerably in different rats, and hence that conclusions from treated infections should not be drawn without due regard to findings in untreated controls.

The general course of the blood infection in rats exposed to infection on one occasion was as follows: microfilariae appear in the blood after 51 days and increase in numbers during the next month or so, after which the number tends to remain more or less constant with wide variations about the mean. But in one rat the intensity was maintained at 140 to 240 microfilariae per cmm. for 12 months, while in another the intensity was maintained at 80 to 190 microfilariae per cmm. for six months, but dropped progressively during the following 3 or 4 months and finally disappeared. In another series of rats which were infected by mass exposure on several occasions, some showed counts of 1,500, 840, 675, 450 and 140 microfilariae per cmm. about the third or fourth month later and after the seventh or eighth months these counts dropped to 530, 45, 30, 10 and 20 respectively, while in other rats which died seven to twelve months after their last exposure, many of the adult worms were dead and encapsulated.

Another important variable is the relationship between the death of the adult worm and the disappearance of the microfilariae from the peripheral blood. The persistence of microfilariae in the peripheral blood in the absence of the adult is known to vary from days to weeks and even months.

J. J. C. Buckley

VARGAS, L. Notas sobre la oncocerciasis. VI. Consideraciones sobre la biologia de las larvas de simulidos. [**Notes on Onchocerciasis. VI. On the Biology of Simuliid Larvae.**] *Gac. Méd. de México.* 1947, Dec. 31, v. 77, No. 6, 346–52.

Simulium larvae feed on particles brought down in running water—bacteria, fragments of phanerogam plants, various algae such as Ulothrix, Cladophora, Vaucheria, Conferva, Euglena, Spirogyra, and diatomaceae, copepods, etc. The larvae live preferably in fairly rapid flowing water, but not too rapid. The author shows how these factors—the presence of the appropriate food, the character and flow of water, the temperature, protection from winds, etc.—participate to facilitate the adults in the deposition of their ova and the larvae in developing in the different areas of Chiapas, Mexico, in parts of which *Onchocerca* is rife.

H. Harold Scott

FORATTINI, O. P. Considerações clínicas sôbre um caso de localização apendicular do Trichocephalus trichiurus (Linnaeus 1771) Blanchard 1895. [**Clinical Observations on a Case of *Trichuris trichiura* Infection of the Appendix.**] *Anais Paulist. Med. e Cirurg.* 1946, Nov., v. 52, No. 5, 327–31, 2 figs.

WOOD, Fae D. **A Critical Review of Pinworm Infection.** *Ann. Western Med. & Surgery.* 1948, Aug., v. 2, No. 8, 347–57, 1 fig. [58 refs.]

A general review and discussion of present knowledge.

PICCIOLI, Annibale. Contributo alla terapia della ossiuriasi nell'infanzia col violetto di genziana. Osservazioni relative a casi trattati in ambiente tropicale. [**The Treatment of Enterobiasis in Infants by Gentian Violet.**] *Acta Med. Italica.* 1948, July, v. 3, Suppl. No. 3, 112–20. [37 refs.] English summary.

Much of this article is taken up with records of the prevalence of helminthiasis in different countries. The author then goes on to give an account of the treatment of three groups of patients: (1) Twenty-six prisoners of war, 25–48 years of age, in Kenya [the title of the paper restricting the observations to infants is not quite correct]; (2) Sixty-four Somali children; (3) Thirty-two "national" [? Italian] children. To those of the first group were given gentian violet [preparation not stated] 6 cgm. twice a day during two periods of 8 days, with a week's rest between. The drug was well tolerated; pruritus ani soon disappeared and in 25 the ova were no more seen; in the case of the other, the ova reappeared after an absence of 30 days. In the second group there were 35 boys and 29 girls, their ages ranging between 2 and 12 years. The symptoms exhibited were marked anorexia, vague abdominal pain, intense nocturnal pruritus ani, intermittent diarrhoea with much mucus and sometimes with blood. In addition to *Enterobius*, *Diphyllobothrium* ova were common and also *Cercomonas* and *Blastocystis*. The mode of administration was 1 cgm. for each year of age, divided into 3 keratin-coated capsules, one after each of the principal meals—three courses of 5 days' treatment with intervals of 5 days free. Ova were passed in large numbers at first, but symptoms cleared up and

at the end of treatment no ova could be found in 61 ; a month later re-examination showed that 60 were still negative, 4 positive. The age of those of the third group were between 3 and 8 years. In six of the children the disease had persisted for about 2 years. The gentian violet was given in two courses of 5 days, with an interval of the same length and dosage as for group 2, 1 cgm., for each year of age. With both groups calomel ointment was applied locally for the pruritus. During the first 5-day course many worms were passed, after which they disappeared. Faecal examination 20–40 days after cessation of treatment showed 29 cured ; three others aged 3, 4 and 7 years, were negative at 20 days but positive again at 40 days. These were subjected to another course of two 5-day treatments and they became negative and were still negative when re-examined after 2 months. Three mothers, aged 25, 28 and 32 years, who were positive, were also successfully treated by this method.

H. Harold Scott

Thorborg, N. B., Tulinius, S. & Roth, H. Trikinose paa Grönland. [**Trichiniasis in Greenland.**] *Ugeskr. f. Laeger.* 1948, May 20, v. 110, No. 21, 595–602, 1 map & 1 fig. [34 refs.] English summary.

Skeller, E. Trichinose i Kutdligssat. [**Trichiniasis in Kutdligssat, Greenland.**] *Ibid.* 602–7, 3 figs. English summary.

These papers are reviewed in *Bulletin of Hygiene*, 1948, v. 23, 687.

Ross, Winifred M. **A Note on the Collection of Live Adults of *Trichinella spiralis*.** *Canadian J. Comp. Med.* 1948, June, v. 12, No. 6, 152–4, 2 figs.

While the separation and collection of encysted larvae of *Trichinella* can easily be accomplished, the collection of living adults in numbers sufficient for the preparation of an experimental test antigen proved a difficult problem which was solved as follows : a rat is killed 5 days after oral administration of infective larvae, having received only water for 24 hours prior to killing. The gut is removed from the level of the duodenum to the caecum and is opened and rinsed in a beaker of warm saline. In a shallow pan of warm saline, the mucosa is stripped off with a glass slide and the muscular part of the gut is discarded after rinsing. The suspension of worms and mucosa in saline is then pipetted on filter paper, through which excess saline passes. The filter paper is then placed face down in a Petri dish of warm saline and the adult worms, stimulated by the heat, detach themselves from the paper and the mucosal shreds and fall to the bottom of the dish. They can be further separated from remaining débris by repeating the process. It is important that the saline be kept warm during the procedure and this is best effected by placing the Petri dish in a sink of gently flowing hot water, producing temperatures of up to 42°C. The technique is illustrated by two line drawings. *J. J. C. Buckley*

DEFICIENCY DISEASES

Crawford, J. N. & Reid, J. A. G. **Nutritional Disease affecting Canadian Troops held Prisoner of War by the Japanese.** *Canadian J. Res.* Sect. E. Med. Sci. 1947, Apr., v. 25, No. 2, 53–85, 2 figs.

In Hong Kong, as in other prisoner-of-war camps in the Far East, the effects of malnutrition developed against a background of intercurrent infection and

excessive physical work. The diet is described in general terms: throughout the period of imprisonment it was deficient in calories, fat, animal protein, and vitamins, being worst at the beginning, in 1942. The authors have not attempted to estimate the intake of individual nutrients, nor to correlate intake levels with the appearance of the various deficiency states.

The greater part of the report is devoted to a detailed and objective description of the nature, course, and response to treatment of the symptoms and signs of deficiency. Preconceived ideas about aetiology and the rôle of specific vitamins have been scrupulously avoided. The value of the work is further increased by the fact that in some cases it was possible to make follow-up observations after repatriation of the troops to Canada.

The first symptoms to develop were urinary urgency, inefficiency of the sphincter, polyuria, and nycturia (nocturnal polyuria). These first appeared after only a week of imprisonment, and continued until 1945. Nearly 100 per cent. of the men were affected. The average urine volume was 6–8 litres in 24 hours. Nycturia was relieved whenever there was an increased intake of meat. The symptoms were worse in cases with gross neurological disturbance.

Next oedema appeared. [The time sequence is to be noted. SINCLAIR has described nycturia accompanying famine oedema in Holland and Germany (see *Bulletin of Hygiene*, 1949, v. 24, Jan.), but says nothing about which came first.] Nearly 80 per cent. of the camp population were affected. At first oedema responded well to rest in bed, and dramatically to intramuscular injections of thiamin. After 1942, however, many cases were resistant to thiamin. It is suggested that these may have been caused by protein deficiency.

Cardiac changes, such as tachycardia, arrhythmias, and systolic murmurs, were common, but there was little clinical evidence of cardiac enlargement. In patients with infections, cardiac collapse was the common cause of death, and it was estimated that the cardiac age was advanced 20 years. Acute cardiac failure does not seem to have been found in the absence of infection. All the cardiac signs responded to treatment with thiamin.

Neurological changes developed at an early stage. These included paraesthesiae, glove-and-stocking hypoaesthesia, calf-tenderness, and changes in the deep reflexes. Loss of visual acuity was common, accompanied by contraction of the visual fields and scotomata. When ophthalmoscopic examination became possible, optic atrophy was found in some cases. An interesting observation is that, although there were no complaints of deafness during the period of imprisonment, audiometric tests made after repatriation showed a diminished perception of high frequency tones.

A serious cause of disability was the condition known as "electric feet". This conformed to the descriptions of "painful feet" in other P.O.W. camps. There was some evidence of vascular disturbance; the pain was worse at night, and was relieved by immersing the feet in water. Gangrene sometimes occurred. There was no response to vitamin B_1, but nicotinic acid, in doses of 20 mgm. each day intramuscularly, reversed the progress of the syndrome. There has been conflict of opinion and evidence about the efficacy of nicotinic acid in this condition; the authors emphasize that in their cases, because of a probable impairment of absorption, the vitamin was given parenterally. It was noted that subjects of European stock who had been born in Hong Kong and lived all their lives there, were much less liable to "painful feet" than the troops from Britain or Canada.

As in other P.O.W. camps, scrotal dermatitis and lesions of mucosae were common. Conjunctivitis was sometimes accompanied by corneal ulceration, which responded to treatment with shark-oil. In the autumn of 1942 there was an epidemic of pellagrous dermatitis, which cleared up with nicotinic acid.

Swelling of the breast was found in a moderate number of cases. This first appeared in 1942, later became less frequent, and recurred after release and return to European food.

In conclusion, the authors discuss the question of psychological changes. They found no evidence of any specific emotional disturbance ; if anything, there was euphoria rather than depression. *J. C. Waterlow*

LANDOR, J. V. **The Effect of Nutritional Disorders on the Skin and Mucous Membranes as observed in the Civilian Internment Camp, Singapore, during the Japanese Occupation of Malaya.** *Brit. J. Dermat. & Syph.* 1948, Jan., v. 60, No. 1, 1–9, 1 fig. [13 refs.]

Skin affections were very common among internees in the civilian camp in Singapore, especially during the latter two years of the Japanese occupation. Among them were some which appeared to be of nutritional origin.

Nicotinic acid deficiency.—Pellagrous dermatitis conformed to classical descriptions. Diarrhoea and mental disorders were not commonly associated. [The condition of the tongue is not mentioned.] The condition responded rapidly to nicotinic acid and the mass curative and preventive effect of undermilled rice was very evident.

Riboflavin deficiency.—Stomatitis and eczema of the scrotum (oro-genital syndrome) were seen in a number of cases. The condition responded to riboflavin internally when this was available.

Blood blister disease.—A large number of patients were seen whose complaints were of multiple superficial blood blisters mainly occurring on the palate or buccal mucosa. These blisters were irregularly associated with other deficiency diseases and no available treatment was found to be effective. The author draws a parallel between this condition and that known in Africa as "onyalai". [There are, however, many points of difference between the two, particularly the severe constitutional disturbance and grave prognosis in onyalai, whereas the blood blister disease in the camps was "in general not a troublesome condition".]

Subcuticular haemorrhages.—Petechial or larger haemorrhagic spots appeared in or under the skin particularly on the backs of the hands, legs and thighs. No available treatment proved of value.

Erythema nodosum.—36 cases of a disease resembling erythema nodosum were seen during the last year of internment. The association with other nutritional disorders was slight, but it seemed probable that malnutrition was part of the cause.

Sword bean dermatitis.—In a few subjects, severe pruritus and eczematous type of dermatitis followed the ingestion of sword bean (*Canavalia ensiformis*). *Dean A. Smith*

RAMAN, T. K. **Pellagra in India.** *Indian Physician.* 1948, June, v. 7, No. 6, 141–72, 22 figs. on 4 pls. [Numerous refs.]

The term "pellagra" is used to describe a variety of conditions. In presenting a clinical study of 102 cases, the author uses the term in its strictest sense : symmetrical exfoliative dermatitis with a sharply demarcated margin was the diagnostic criterion. The cases occurred in Vizagapatam where rice is the dietary staple. The introduction of maize as a common item of diet in 1945 has not been followed by any increased incidence.

The rash usually occurred on the exposed areas of skin, but it was occasionally also in unusual situations such as the groins and under the breasts.

Gastro-intestinal symptoms were common and included anorexia and diarrhoea. Gastric analysis showed either greatly diminished acidity or achlorhydria. X-ray examination showed gastric atony. Glossitis, though sometimes present, was not a marked feature. Evidence of associated B complex deficiencies such as angular stomatitis were common and beriberi and hypoproteinaemic oedema co-existed in many cases.

The cerebrospinal fluid was examined in twelve cases and no abnormality was found. Nor was any change, attributable to pellagra, detected in the cardiovascular system. Sedimentation rate was normal in cases uncomplicated by other diseases. Fat analysis of the stools indicated defect in both digestion and absorption.

Treatment by means of a full diet, crude liver extract and nicotinic acid produced rapid improvement in the majority of cases. The paper is illustrated with some good photographs of pellagrous skin lesions.

[In the discussion of the aetiology of pellagra almost all important recent work is quoted, but the exposition is less lucid than that of the clinical study and does not greatly clarify a complex subject.] *Dean A. Smith*

DE PAIVA, B.-H. C. Modificações electrocardiográficas na pelagra. [**Electrocardiographic Changes in Pellagra.**] *Rev. Brasileira Med.* Rio de Janeiro. 1948, Aug., v. 5, No. 8, 566–8, 2 figs. [10 refs.]

The English summary appended to the paper is as follows :—

"The author reports the details of a case of pellagra with electrocardiographic abnormalities with return to normal conditions, after exclusive administration of nicotinic acid. Several authors, such as Ashman and Hull, deny the existence of those anomalies, stating that those found in similar cases are due to deficiency of thiamine, and not of nicotinic acid (even in the case of pellagra). However, care was taken to administer only the latter, in doses of 400 mg. p. d., during 10 days—a total of 4 grams.—and a completely normal record was obtained. The principal anomaly was the reversion of T in CF3. There are several cases under observation the results of which will be made known in a later publication."

CORKILL, N. L., CREDITOR, H. & STEWART, G. E. S. **Millet Beer and Peanuts as Protective Foods in Africans.** *J. Trop. Med. & Hyg.* 1948, July, v. 51, No. 7, 140–44, 1 graph.

An outbreak of dysentery and deficiency disease occurred among African prisoners of war in the Anglo-Egyptian Sudan, who were subsisting on a diet low in calories, with millet as the staple. The clinical picture was dominated by the signs and symptoms of pellagra, although the ration contained no maize. There were also some cases of scurvy, beriberi and " burning feet ".

The camp population consisted of two groups, Christians and Moslems. Cases at first occurred only among Christians, who had been eating no meat, whereas the Moslems had been receiving 8 oz. a week. After the beginning of the outbreak, a new diet scale was introduced, the meat ration was increased, and millet-beer and peanuts were added to the ration as sources of vitamins. The Moslems refused the beer, and thus became a control group for the effects of beer.

In both Christians and Moslems, the additions to the diet were followed by an increase in deficiency disease. In the Christians the increase was only temporary, whereas in the Moslems it persisted. This, it is claimed, demonstrates the value of millet-beer as a protective food, since the rations were [illegible] acid.

respects equal. To explain the rise in morbidity, the authors postulate a stimulation of metabolism resulting from an increased caloric intake. They suggest that whenever the caloric value of a deficient diet is increased, protective concentrates should be given at the same time, as otherwise marginal deficiency states may be made worse.

The lower morbidity in the Christian beer-drinkers is in agreement with earlier observations of one of the authors. He found that among the Sudanese the "burning feet" syndrome affected mainly those who did not drink millet beer, and that it did not occur in tribes eating peanuts.

[The suggestion that vitamin concentrates should be given when the caloric value of an inadequate diet is increased, if taken in a general sense, is likely to prove discouraging to workers in the field, since these concentrates are often difficult to obtain. The commonly accepted view is that, except in the case of those who are actually ill, the aim should be to supplement the diet with natural foods, such as the millet-beer and peanuts used by Dr. Corkill and his colleagues. Their observations, and the hypothesis put forward to explain them, suggest that such measures are not enough. In field work there are many uncontrollable variables; in the reviewer's opinion, the data do not form an adequate basis for a recommendation of such significance. From the theoretical point of view, there is no clear-cut evidence that the requirement for any vitamin except thiamin is affected by an increased caloric intake.]

J. C. Waterlow

Corkill, N. L., Creditor, H. & Stewart, G. E. S. **Millet Beer and Peanuts as Remedial Foods in Polyhypovitaminosis.** *J. Trop. Med. & Hyg.* 1948, Aug., v. 51, No. 8, 160–68.

The authors have previously described how they used peanuts and beer made from sprouted millet as prophylactic nutritional supplements in a prisoner-of-war camp in the Anglo-Egyptian Sudan [see above]. They now describe the effect of giving the same foodstuffs to patients actually suffering from manifestations of deficiency.

From a camp population in which there was a considerable incidence of multiple B complex deficiency and of scurvy, 100 men were chosen and divided into five groups. Food supplements of beer, peanuts, peanuts and beer, and marmite (of questionable age) were made available to the first four groups respectively while the fifth remained as a control.

The progress of each group was recorded by means of scoring the severity of ten physical signs believed to be stigmata of malnutrition. On this basis and on that of hospital admissions and deaths, it is clear that the group on both nuts and beer fared best and the controls worst: with the groups on nuts alone and on beer alone approximately equal and intermediate.

[The difficulties of life and the practice of medicine in a prison camp make the collection of precise data almost impossible. The statistical value of the present results is somewhat diminished by three circumstances: (1) the questionable validity of the sampling; (2) the provision, simultaneously with the supplements, of a greatly improved basic diet, including 6 oz. each of meat and fresh vegetables daily; and (3) the fact that though the supplements were provided the subjects did not always eat all, or even any, of them. None the less the results suggest strongly that peanuts and millet beer were valuable supplements to a diet which up to the time of the experiment had consisted preponderantly of sorghum, and hastened improvement even when considerable [redacted]s of meat and vegetables were added.]

Dean A. Smith

ROYES, K. **Infantile Hepatic Cirrhosis in Jamaica.** *Caribbean Med. J.* 1948, v. 10, Nos. 1/2, 16–48. [52 refs.]

Nearly 200 cases of cirrhosis of the liver in infants and children were seen each year at the Kingston Public Hospital, Jamaica, between 1936 and 1940. This figure indicates the magnitude of the problem, since the population of the whole island is only 1¼ millions.

This paper is based on 32 cases. The author's objective has been, by an analysis of case-histories and an enquiry into the patients' social and economic background, to throw some light on the aetiology of the disease. Cirrhosis is found only in the children of the poorer classes. It is commoner in boys than girls. There is no evidence of a hereditary or familial factor. Two points stand out from the case-histories: (i) the patients showed a higher incidence of infections, of chest, gastro-intestinal tract, and skin, than the normal child population; (ii) the diet, estimated qualitatively, was in all cases inadequate in protein, vitamins, and minerals, and adequate only in calorie content.

The age at the time of admission to hospital ranged from 21 months to 8 years. No child was seen before weaning, which took place at an average age of 8 months. After weaning the diet consisted mainly of starchy roots and porridge, with small supplements of milk, salt fish, and vegetables. The average age of onset of symptoms was 4 years. The common presenting symptoms were abdominal distension, anorexia, fever, and vomiting. On examination, ascites was present in all but one case, and nearly all had pyrexia and hepatomegaly. Oedema of the legs was present in 6, jaundice in 5 and splenomegaly in only 3. Most of the children were underweight for their age, but specific signs of vitamin deficiency were uncommon. The Kahn test was negative, and no significant changes were found in urine or stool. The blood showed a moderate anaemia in the majority of cases, a reduction of the albumin : globulin ratio, an increased sedimentation rate, and sometimes a mild bilirubinaemia. Histological examination of the liver in one fatal case showed strands of fibrous tissue radiating from the portal channels, surrounding lobules and cutting across them. Swollen and necrotic parenchymal cells were seen at the periphery of some lobules.

The author was able to follow the course of the disease over a period of 3 years in all but 3 of the 32 cases. Nine recovered and were free from symptoms, 9 showed some recovery, but symptoms persisted, 7 died from intercurrent disease, and 4 died of progressive hepatic failure within 6 weeks of the onset. All those in hospital received a good mixed diet; some in addition were given liver extract with yeast or iron. Although no precise comparison is claimed, it was felt that liver had a distinctly beneficial effect. Another factor affecting the prognosis was the occurrence of intercurrent infection. This was usually followed by a return of ascites, nausea, and vomiting.

In discussing aetiology, the author believes that dietary deficiency alone is not enough to account for this type of cirrhosis, since only a small proportion of children of the same economic status, eating similar food, are affected. He suggests that infection, particularly repeated infection, may be the precipitating factor, since it has been shown experimentally that malnutrition increases the susceptibility of the liver to many different kinds of poisons.

[This is the first paper dealing with cirrhosis in the tropics, of which the reviewer is aware, in which the cases have been followed systematically over a period of years. Dr. Royes does not claim that the data presented give a complete picture of prognosis and incidence. It is possible that many subclinical cases occur, in which hepatic fibrosis reaches an apparently stationary state, as is suggested from the post-mortem studies of DAVIES in East Africa (this *Bulletin*, 1948, v. 45, 633). There must presumably be a tend[illegible]

compensation or partial recovery, since, as the present author points out, clinical cirrhosis in adults is not particularly common in Jamaica. One criticism may be raised: it is perhaps unsound to assume the identity of cirrhosis in Jamaica with infantile, so-called biliary, cirrhosis in India, since there are important clinical differences. In the latter, the onset usually occurs at 1–2 years, and the course is more rapid and more uniformly fatal. Splenomegaly and jaundice are present at an early stage.] *J. C. Waterlow*

SPRUE

CHRISTOFFERSEN, N. R. & HEINTZELMANN, F. Folinsyreterapi ved leverrefraktaer makrocytaer Sprueanaemi. [**Macrocytic Anaemia in Sprue, refractory to Liver Treatment, cured with Folic Acid.**] *Nordisk Med.* 1948, Oct. 1, v. 40, No. 40, 1779–80, 1 fig. English summary (6 lines).

Report of a case.

FERGUSON, J. W. & CALDER, E. **Folic Acid in Non-Tropical Sprue: with particular reference to Fat Absorption and Radiological Appearances of the Small Intestines.** *Glasgow Med. J.* 1948, Oct., v. 29, No. 10, 341–56, 13 figs. [18 refs.]

"The results are reported of an investigation into the effect of folic acid on seven cases of non-tropical sprue.

"Of the cases in which the bone marrow was normoblastic, one patient appeared to obtain subjective improvement. In the others, the general condition was unaltered or had deteriorated. There was no evidence of improvement in fat absorption, biochemical findings, blood picture or intestinal pattern in any of the patients.

"Of the two patients who were known to have had megaloblastic marrow reaction, one showed clinical and haematological improvement and a return of the intestinal pattern to normal; but the steatorrhoea persisted. In the other there was no apparent clinical or haematological improvement but again there was a striking radiological improvement without improvement in fat absorption."

HAEMATOLOGY

VAN DER MERWE, C. F. **The Blood Picture of Healthy Europeans in South Africa.** *South African Med. J.* 1948, Aug. 14, v. 22, No. 15, 482–7, 7 graphs. [49 refs.]

Blood counts were carried out on 700 healthy Europeans (374 males and 326 females) living in South Africa at heights between 3,000 and 5,500 feet above sea level.

The author's figures have been arranged in tabular form :

		Approximate range	Extremes
Red cells—10^6 per cmm.	Males	5·0 to 6·9	4·0 & 7·8
	Female	4·5 to 6·5	4·0 & 7·2
Haemoglobin gm. per 100 ml.	Males	16·0 to 21·6	14·4 & 23·2
	Females	15·2 to 20·0	14·4 & 21·6
Mean diameters of red cells, μ	Males		7·1 & 7·8
	Females		7·1 & 8·1
Leucocytes per cmm.		4,500 to 11,000	3,500 & 18,000
Eosinophils per 100 leucocytes		1 to 8	0 & 28
Monocytes per 100 leucocytes		0 to 12	— & 20
Lymphocytes per 100 leucocytes		23 to 53	16 & 63
" Rod-shaped leucocytes " per 100 leucocytes		2 to 20	0 & 28
Polymorphonuclears per 100 leucocytes ...		30 to 60	22 & 70

For estimating the mean diameters of the red cells, he used Pijper's blood cell tester and for the differential count he counted only 100 leucocytes.

The author concludes that " there exists a much wider range in normal people than is usually assumed ". Many supposedly abnormal blood pictures are included in this range. Blood pictures when possible should be compared not with traditional standards, but with other blood pictures of the same person.

[The results are shown in a series of carefully-drawn (and well-reproduced) curves, and to get the full value of this paper one must refer to these. This is made necessary by the author's failure to apply statistical methods to the figures which he has so laboriously compiled. He has apparently selected entirely arbitrarily what we have interpreted as the " range " (he has occasionally used the word) ; for example, he writes " Curve I shows that values of approximately 5·0–6·9 million red corpuscles per cmm. were found in 374 healthy males—" and " Extreme values of 4·0–7·8 millions for men . . . were occasionally found ". The extreme arbitrariness of his choice of " range " is shown by the fact that from his erythrocyte curve it is apparent that only some half-dozen instances at each end of the curve are excluded from his range (5·0 to 6·9 millions), whereas he states that in 137 persons no eosinophils were found (range 1 to 8 per cent.). The application of elementary statistical methods would have increased the value of this paper considerably. From his figures for polymorphonuclears in the text (quoted above), he has apparently excluded " rod-shaped leucocytes ", but in curve VII, the polymorph (sic) curve extends from 30 to 80 per cent., and obviously includes all neutrophil granulocytes.]

L. E. Napier

Egeli, E. S. & Ergun, S. Beyaz insanda zenci anemisi (sicklecellanemia : orak eritrositii anemi). [**A Case of Sickle Cell Anaemia in the White.**] *Türk Tip Cemiyeti Mecmuasi.* 1946, Aug., v. 12, No. 8. [In Turkish 251–61, 6 figs. English summary 39–40.]

DAVIDSON, L. S. P. **Pteroylglutamic Acid (Folic Acid). Therapeutic Indications and Limitations.** *Edinburgh Med. J.* 1948, July, v. 55, No. 7, 400–411. [32 refs.]

Synthetic folic acid contains the amino acid, glutamic acid, linked with para-aminobenzoic acid and the pteridine nucleus. The name pteroylglutamic acid (PGA) is preferable. In natural foods and tissues it occurs mainly in the form of conjugates, the most important of which is pteroylhaptaglutamic acid or PHGA. These conjugates have been shown by biological assay to be inactive, but, if the additional molecules are removed by hydrolysis, the property of stimulating the test-organisms is regained.

This is of interest because it suggests that the fundamental defect in Addisonian pernicious anaemia is the inability of the patient to utilize PHGA by its conversion to the free form; this can be done *in vitro* by the use of enzymes such as takadiastase and by the action of acids and alkalis, while in the living animal hydrolysis is probably accomplished by the action of a naturally occurring enzyme called Vitamin B_c conjugase found in many organs, such as the liver, kidney and pancreas. Some organs indeed contain also inhibitors of the conjugase system. Biological assay of PGA in foods becomes complicated, so that published reports of the content of PGA vary widely. It is more easily damaged by cooking than other members of the vitamin B_2 complex and the process of canning has a deleterious effect. The daily intake by a normal person is less than 1 mgm., though it is possible that this amount may be augmented by the production of PGA by bacterial synthesis in the intestinal tract. This certainly occurs in the rat which can manufacture up to 70 per cent. of its daily requirement by this method, so that sulphonamides must be administered in order to produce the PGA deficiency syndrome, but proof that this synthesis occurs in man is not available.

Certain synthetic compounds, such as *d*(-)methyl folic acid, have an antagonistic action to PGA. This action can be shown by their effect in inhibiting the growth-promoting action on *Lactobacillus casei*, or *Streptococcus faecalis* β. Deficiency syndromes in animals fed on a PGA-deficient diet develop more rapidly and severely when these antagonistic compounds are added to their diet.

Pteroylaspartic acid, though closely related chemically to PGA, is therapeutically ineffective in Addisonian pernicious anaemia and is even antagonistic to PGA, but not to purified liver extract. Sufficient evidence is not yet available to explain the mechanism by which PGA produces its dramatic effects on the haemopoietic and alimentary system, but there is ample evidence to show that PGA is neither Castle's intrinsic or extrinsic factor nor the interaction product which is stored in the liver and is present in purified extracts given parenterally. In the chemical processes employed for the preparation of liver extracts, those fractions which contain PGA are discarded so that the end products are practically devoid of it, but since the haemopoietic effects produced by the daily administration of 1–2 mgm. of PGA are indistinguishable from those resulting from a single injection of refined liver extract containing only a few microgrammes of the active anti-anaemic principle, it appears reasonable to believe that their mechanisms of action are closely related. As a working hypothesis it is suggested that the fundamental defect in Addisonian pernicious anaemia is the patient's inability to utilize PHGA: furthermore, that this metabolic error is directly attributable to the patient's inability to produce the active principle present in purified liver extract consequent upon a failure of gastric secretion of Castle's intrinsic factor. Although the mechanism is still obscure, the fact remains that a deficiency of PGA with its haemopoietic syndrome can result from either defective intake, or defective absorption, of PHGA, or from a defective production of the factor present in purified liver extract.

As a member of the vitamin B complex PGA should function according to certain well defined principles which are applicable to vitamins in general. The clinical features characteristic of any particular vitamin deficiency state should appear consistently when a certain stage of deficiency has been reached, but will disappear when the deficiency has been corrected. The clinical features should not respond to the administration of any other substance but the vitamins concerned.

The manifestations of PGA deficiency are concerned with the haemopoietic and alimentary systems. In general it will be found that all types of anaemia with a normoblastic marrow fail to be influenced favourably by PGA.

The intramuscular injection of large quantities of PGA is wasteful and uneconomic, for much of the injected material is rapidly excreted in the urine. It is much more effective to give 5 mgm. daily by mouth for thirty days than one single dose of 150 mgm. by mouth or injection.

The daily dose of PGA required for optimal blood regeneration varies from patient to patient. The lowest effective dose recorded is 1 mgm. The maintenance requirements of PGA have not yet been finally established. The author has had cases which maintained a normal blood level on a daily intake of 1·0 and 2·5 mgm. over a period of 255 or 384 days, respectively.

However, in view of the dangers of developing neurological disease, to which attention has been called, maintenance treatment of pernicious anaemia with PGA can no longer be recommended. It had been found that a dose of 10 mgm. PGA daily by mouth is effective in the treatment of megaloblastic anaemia ol pregnancy and in the sprue syndrome with megaloblastic anaemia. Sternaf puncture when repeated thirty-six to forty-eight hours after the administration of PGA to all types of megaloblastic anaemia shows the same remarkable transformation of the bone marrow towards the normoblastic state as had been found in pernicious anaemia treated with parenteral liver extract. In pernicious anaemia of pregnancy, in nutritional (tropical) megaloblastic anaemia, megaloblastic anaemia of infants, and some cases of the sprue syndrome when once the blood picture has been restored, no further maintenance therapy is required.

In the sprue syndrome, the results of treatment with PGA are especially good in tropical sprue, particularly with megaloblastic anaemia ; in idiopathic steatorrhoea with megaloblastic anaemia responses have been good in some cases, though other workers have had negative results. No benefit appears to occur in the majority of cases of coeliac disease in children. Subacute combined degeneration of the cord is neither prevented nor cured by PGA. More serious still is the statement that PGA actually increases the liability to involvement of the nervous system and accelerates its progress. It has been suggested that PGA interferes with the capacity of nerve cells to use glutamic acid.

It therefore appears that PGA is potentially a dangerous drug and must not be employed except for limited periods and in exceptional circumstances in pernicious anaemia and probably in some other cases. A warning is issued against the practice of polyvalent therapy of the anaemias with iron and liver extract simultaneously until the correct diagnosis has been established.

L. Manson-Bahr

Spies, T. D., Stone, R. E., Garcia Lopez, G., Milanes, F., Lopez Toca, R. & Aramburu, T. **Thymine, Folic Acid, and Vitamin B_{12} in Nutritional Macrocytic Anaemia, Tropical Sprue, and Pernicious Anaemia.** *Lancet.* 1948, Oct. 2, 519–22, 4 figs.

Within the last three years folic acid, thymine or 5-methyl uracil, and vitamin B_{12} have been found to produce blood regeneration in certain types of

macrocytic anaemia. Much work is now being done to elucidate the structure of vitamin B_{12}

The extreme variation in the individual response makes it desirable to observe the effect of folic acid, thymine and vitamin B_{12} in the same person in the same degree of relapse, under comparable conditions and on the same diet. Three patients were selected, each was admitted to hospital in relapse three times and on each occasion was given a different drug, while the diet and conditions of study were kept constant.

The first case was one of nutritional anaemia in a white man of 51 ; the second a Cuban farmer, aged 70, with tropical sprue and the third a white man of 46 with pernicious anaemia.

Each compound produced a blood response and a definite clinical improvement. The fact that three distinct chemical compounds have proved effective in each of three distinct clinical syndromes appears to suggest that a great deal can be learnt of the pathogenesis of these diseases.

It appears that several thousand times the weight of thymine is required to produce a response similar to that produced by folic acid, and that several thousand times the weight of folic acid is required to produce a response similar to that produced by vitamin B_{12} The findings suggest that this last-named is by far the most potent antianaemic substance known. A single dose was injected in the case of each patient and the dosage was 6 μgm., 23 μgm., and 15 μgm., respectively. *P. Manson-Bahr*

Birks, P. H. **A Note on the Value of Folic Acid in the Treatment of Macrocytic Anaemia in Assam Tea Garden Labourers.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1948, Sept., v. 42, No. 2, 203–5.

" The results of treatment with folic acid in 20 severe cases of pregnancy or nutritional anaemia are recorded. As judged by European standards, the final results are anything but normal, but they do demonstrate the life-saving properties of folic acid which should be regarded as a specific drug in this difficult and often fatal condition."

VENOMS AND ANTIVENENES

Prado, A. & Hoge, A. R. Notas ofiológicas. 21. Observações sobre serpentes do Perú. [**Notes on Ophidia. 21. Some Observations on Peruvian Snakes.**] *Mem. Inst. Butantan.* 1947, v. 20, 283–95, 4 figs. (1 map) on 3 pls. English summary (2 lines).

Bücherl, W. Duas novas especies do genero *Eupalaestrus* Pocock, 1901. [**Two New Species of the Genus *Eupalaestrus* Pocock, 1901.**] *Mem. Inst. Butantan.* 1947, v. 20, 297–314, 8 figs. (2 coloured) on 4 pls. English summary.

Bücherl, W. Estudo comparativo das espécies brasileiras do género *Pamphobeteus* Pocock, 1901 (*Mygalomorphae*). [**Comparative Study of the Brazilian Species of the Genus *Pamphobeteus* Pocock, 1901** (*Mygalomorphae*).] *Mem. Inst. Butantan.* 1947, v. 20, 233–81, 10 pls. English summary (2 lines).

Hoge, A. Notas erpetológicas. 3. Uma nova espécie de *Trimeresurus*. [**Notes on Herpetology. 3. A New Species of** *Trimeresurus*.] *Mem. Inst. Butantan.* 1947, v. 20, 193–202, 6 figs. & 1 chart. English summary.

Bier, O. G. Estudo quantitativo da reação de floculação entre o antiveneno crotálico e uma fração purificada do veneno da Cascavel neotrópica (*Crotalus t. terrificus*). [**Quantitative Studies of the Flocculation Reaction between the Crotalic Antivenom and a Purified Fraction of the Neotropic Rattlesnake Venom** (*Crotalus t. terrificus*).] *Mem. Inst. Butantan.* 1947, v. 20, 31–7, 1 graph.

The English summary appended to the paper is as follows :—

" 1. By using a purified, electrophoretically homogeneous fraction from the venom of *Crotalus t. terrificus*, it has been possible to make a direct evaluation of the combining ratios between venom and antivenom.

" 2. As expected from the molecular weight of crotoxin (30-33000) the ratio at the equivalence zone is near 10, i.e., double of that observed for diphtheria toxin (molecular weight 70,000) with equine antitoxin."

Eichbaum, F. W. Ação dermatotóxica de venenos ofidicos e sua neutralização pelos antivenenos. [**Dermatotoxic Activity of Ophidic Venoms and their Neutralization by the Antivenenes.**] *Mem. Inst. Butantan.* 1947, v. 20, 79–93. English summary.

Parenteral injection of the antivenene of *Bothrops jararaca* gives protection against the general toxic action of the venom, but will not prevent the local necrotic effect. In this article the author records his study of the dermatotoxic action of the venoms of *B. jararaca* and of the rattlesnake, *Crotalus terrificus* in rabbits and dogs. Three types, or degrees, of action result from the local application of the venom to the skin ; oedema with surrounding infiltration ; haemorrhage ; and necrosis. A study of the different fractions of the venom of *B. jararaca* showed that the fraction producing oedema was different from that producing the haemorrhage and necrosis. The former is not neutralizable by the antivenene even in large doses and is, moreover, thermostable, withstanding heating to 100°C. for 10–15 minutes ; the latter is neutralizable (*in vitro*) by the antivenene and will not resist a temperature of 65°C. for half-an-hour. If venom and antivenene are left in contact for that time at 37°C., local injection of the mixture prevents the haemorrhage and necrosis, but not the oedema.

In the case of *Crotalus* venom, if this be applied to the skin, erythema, oedema and necrosis follow and the [intravenous ?] injection of antivenene will not affect this ; it is presumed that the concentration is not sufficient, but the *local* injection of venom and antivenene, or even if the antivenene be injected 10 minutes after the venom, prevents the necrosis and the erythema, but not the oedema, just as with *B. jararaca*. The reaction to heat in the case of *Crotalus* venom differs also from that of *B. jararaca*. A temperature of 65°C. for 30 minutes abolishes its necrotizing action, boiling for 10 minutes reduces, may even abolish, its power of producing erythema and oedema. *H. Harold Scott*

Eichbaum, F. W. O fator de difusão (" Spreading Factor ") dos venenos de *Bothrops jararaca* e de *Crotalus terrificus terrificus*. [**The Spreading Factor of the Venom of** *B. jararaca* **and** *Crotalus t. terrificus*.] *Mem. Inst. Butantan.* 1947, v. 20, 95–105, 2 graphs. [19 refs.] English summary.

In this study the animals used for experiment were white rabbits, because their skin is thought to be particularly sensitive in indicating the spreading factor. Four samples of *Bothrops* antivenene, 4 of *Crotalus* antivenene and 8 of normal horse serum were used. That the venom of these snakes contains a " spreading factor " has been known for nearly 10 years. The author has found

that this is counteracted by the specific antivenenes. It is, however, enhanced by the addition of horse serum, although the latter by itself has no spreading activity. Since the antivenenes are prepared from horses, the risk is obvious. This serum also fosters the haemolysis resulting from the venom and the transformation of haemoglobin into methaemglobin. Partly responsible for the spreading may be the property of liberating histamine which is possessed by the venoms and it is known that histamine favours the migration of colloidal particles in the cutaneous tissue. The author remarks, in passing, on the presence of mucinase in the venom, a substance which lowers the viscosity of hyaluronic acid ; this test was made on the vitreous body of the eye of the ox.

H. Harold Scott

DERMATOLOGY AND FUNGUS DISEASES

WALSH, E. N. **Tinea Nigra in Panama.** *Arch. Dermat. & Syph.* 1948, Apr., v. 57, No. 4, 732–3.

" Tinea nigra (black fungus) of the palm of 3 white North Americans stationed in the Panama Canal Zone is reported. The disease is caused by a black fungus, *Cladosporium wernecki*, is symptomless and is only of cosmetic importance."

HAUSMAN, R. Over Madura-voet en actinomycose in Indië. [**Madura Foot and Actinomycosis in the Netherlands East Indies.**] *Geneesk. Tijdschr. v. Nederl.-Indië.* 1942, Feb. 17, v. 82, No. 7, 307–19, 5 figs. on 1 pl. [23 refs.]

The English summary appended to the paper is as follows :—

" Madura foot is a deep, chronic, fungous affection of the foot, in the Netherlands-East-Indies hitherto reported in immigrants (four cases), to which is added a new case, occurring in an Arab.

" Description of three endemic cases in Javanese from East-Java. The fungi did not belong to the actinomyces, but could not be identified however. One of them probably belonged to Indiella mansoni (BRUMPT's white mycetoma).

" From the brief descriptions of twelve new cases of actinomycosis, diagnosed in the past five years at the department for pathological anatomy of the Governments Medical School at Soerabaja, it is obvious that actinomycosis occurs as frequently in the Netherlands-East-Indies as anywhere else. Therefore it is remarkable that up to the present no cases of actinomycotic mycetoma pedis have been recorded in this country."

SASLAW, S. & CAMPBELL, Charlotte C. **The Use of Yeast Phase Antigens in a Complement Fixation Test for Histoplasmosis. I. Preliminary Results with Rabbit Sera.** *J. Lab. & Clin. Med.* 1948, July, v. 33, No. 7, 811–18. [19 refs.]

The authors deal with the vexed question of the specific character of the complement fixation reaction when applied to tests with *Blastomyces* and *Histoplasma* antigens and the respective immune sera. They employed as antigens washed, heated suspensions of yeast form cultures of *H. capsulatum* and *B. dermatitidis* and immune sera obtained by inoculating rabbits intravenously with formolized suspensions of the fungi. The injections were given daily for six days and were followed by two or more " booster " injections at intervals of 7 days. Using the Kent and Rein technique of the complement

fixation test, they found that cross reactions occurred at relatively low serum titres when these antigens were tested with the heterologous antiserum. By taking quantitative readings, however, they found that the titre of complement fixation was always much higher with the homologous than with the heterologous combinations. For this reason, they recommend that in all diagnostic tests the serum should be tested against both antigens. These findings conflict with those of SALVIN [see this *Bulletin*, 1948, v. 45, 731] who, using the Bengtson [wrongly spelled Bengston] complement fixation technique, found no cross reactions between *Histoplasma* and *Blastomyces*. The present authors therefore tested antigens prepared according to Salvin's method, with immune sera, using the Kent and Rein technique, and found that cross reactions occurred.

Histoplasma antigen did not react with immune sera for *Candida albicans*, *Torulopsis neoformans*, *Sporotrichum schencki* or *Paracoccidioides brasiliensis*.

J. T. Duncan

SAĞLAM, T. Türkiyede ilk histoplasmosis vakasi. [**First Reported Case of Histoplasmosis in Turkey.**] *Türk Tip Cemiyeti Mecmuasi*. 1945, Dec., v. 11, No. 12. [In Turkish 494–503, 2 figs. [11 refs.] English summary 74–5.]

A fatal case in which *H. capsulatum* was isolated from a spleen puncture.

LACAZ, C. da S. & DE OLIVEIRA, E. Blastomicose da região ano-retal. Considerações sôbre dois casos. [**Blastomycosis of the Ano-Rectal Region. Consideration on Two Cases.**] *Hospital*. Rio de Janeiro. 1948, June, v. 33, No. 6, 845–54, 3 figs. [11 refs.] English summary (8 lines).

Little is known of the epidemiology of South American blastomycosis, but it is generally assumed because of the almost constant occurrence of early lesions of the disease on the bucco-pharyngeal mucosa that this is the most frequent portal of infection. The source of the infection, however, has not been proved, and in this respect the observations of the present authors are of special interest. After referring to two cases, reported in 1930 and 1940, in which lesions, which may have been primary, were present in the ano-rectal region, they describe two new cases with lesions in this area, and point out the probable association of the infection with the use, in the toilet of the anus, of leaves and other raw vegetable matter which may carry the fungus *Paracoccidioides brasiliensis*.

When the disease is generalized it may be difficult to decide whether the ano-rectal lesions are primary or secondary to lesions in other parts of the body, but the authors are satisfied that in two, or possibly three, of the cases referred to the site of infection was the ano-rectal mucosa and the source of the fungus the vegetable material used in the anal toilet.

In treatment, sulphadiazine internally and applied locally, supplemented by a fungal vaccine, proved effective. *J. T. Duncan*

HEAT STROKE AND ALLIED CONDITIONS

PELLICCIOTTA, R. Psicosi da colpo di calore. [**Psychosis from Heat Stroke.**] *Acta Med. Italica*. 1948, July, v. 3, Suppl. No. 3, 120–24. English summary (5 lines).

An interesting case. A man of 32 years, on a ship in the Red Sea, spent a convivial evening with companions and drank "several beers". He was

known to indulge fairly freely in alcohol apart from festive occasions. He left them to go to bed. At 5 a.m. he was seen wandering about the deck. He would not speak and did not appear to recognize anyone. He was admitted to hospital. His face was pallid, eyes open, face immobile with an " indefinable smile " and contented expression. He seemed quite oblivious of his surroundings and took no notice when questioned and lay motionless except that his fingers moved as if he were unravelling string. This movement ceased if the hands were held, but began again when they were released. Breathing was calm and regular, pupils normal, reacting to light, patellar reflexes normal; no sign of drunkenness. About 7 a.m. the temperature began to rise and went to 42°C.; at 9 a.m. he passed into coma and died at 9.30. The temperature remained up after death [how long is not stated]. The diagnosis from cerebral malaria, epilepsy, dementia precox and other conditions is discussed. The author refers to another case, closely resembling this and also ending fatally, in which the symptoms occurred in an alcoholic. [Unfortunately, no post mortem examination was held; at all events it is not mentioned in this paper.]

H. Harold Scott

CHRISTENSEN, W. R. **Effects of Physical Characteristics of Fabrics upon Physiological Heat Load and Subjective Reactions.** *J. Indust. Hyg. & Toxicol.* 1948, July, v. 30, No. 4, 251–5. [11 refs.]

For some textile fabrics' physical characteristics, such as their thermal resistivity, have been determined, but for many of the new fabrics used for special military clothing during the war no such data were available. Furthermore, no information was available concerning the physiological load imposed in hot environments by the wearing of garments made from some of these fabrics. The present paper describes the results of an investigation of the physiological heat-loads imposed by some of these garments, and of subjective reactions of the wearers. The tests were made in a climatic chamber under simulated jungle conditions. Air and walls were kept at 90°F., with the wet-bulb temperature at 86°F., and the wind speed was 1·5 or 5·8 miles per hour. The subjects were six to ten soldiers who had been acclimatized to the test environment for one month. The garments tested were U.S. Army fatigue uniforms made from nine test fabrics varying from light poplin or nylon cloths to a cotton herring-bone twill. This latter fabric was of 70 per cent. greater weight than the lightest ones. The dry weights of the uniforms varied from 887 gm. for the nylon twill to 1,450 gm. for the heavier cotton twill. The air permeability of the fabrics varied greatly—from only 2·1 cc. per second for a cotton Oxford cloth to 171 cc. per second for a Fortisan yarn mesh.

During the experiments, the subjects walked on a horizontal treadmill at 3½ miles per hour for a period of one hour, wearing one of the test uniforms over a standard basic assembly. Rectal temperatures and pulse rates were measured at the end of the exercise, and the sweat loss during the period of exercise was ascertained. The comments of the subjects dealt mainly with coolness, drag, skin sensation and overall preference.

With a wind of 1½ miles per hour, the heat loads imposed by the test fabrics were influenced mainly by their weight, thickness, and possibly by the degree of wetting during use. With a wind of 5·8 miles per hour, however, different results were observed. Then the fabrics which showed improvement with respect to heat load were those which presented a greater wetted area and were more permeable to air. Coolness, general skin sensation, and the tendency of the material to drag on the skin were the most important criteria in deciding the subjective acceptability of a uniform, coolness and skin sensation being of

major importance. There were, however, inconsistencies between objective and subjective appraisals, and it is concluded that the test subjects were unable to differentiate clearly between the sensations of coolness and other sensory impressions. *Thomas Bedford*

TROPICAL ULCER

SHILLONG : KING EDWARD VII MEMORIAL PASTEUR INSTITUTE AND MEDICAL RESEARCH INSTITUTE 30TH ANN. REP. YEAR ENDING 31ST DECEMBER 1946 [PANDIT, S. R., Director]. pp. 2–3. **Naga Sore Enquiry (Indian Research Fund Association) under the Director.**

During 1946, eleven patients with " naga sore " (a local variety of tropical ulcer) were studied in the hospital attached to the Institute. All patients were from tea estates. The ulcers were distributed on the lower extremities, and were multiple in 4 cases. Seven patients gave a history of trauma and in two the ulcer began on scabies lesions. Blood examination showed evidence of malaria in 2 cases and *W. bancrofti* in two others (without clinical manifestations). One patient harboured ankylostomes and four had other helminths. There were one strong positive and three doubtful Wassermann tests. More than half of those affected suffered from a moderate anaemia, but specific evidence of malnutrition was absent.

The bacteriological flora was characteristic of the usual findings : fusiform organisms were constant and in great numbers in the acute stage, but decreased with age of the ulcer. Spirochaetes were present in four.

In some cases the fusiform organism could be isolated in primary growth, but not in subcultures. Growth requirements were studied in detail with two isolated strains. The organism was a strict anaerobe : for primary isolation 5 per cent. CO_2 was used, but after a few subcultures an atmosphere of hydrogen only proved satisfactory. The organism was Gram-negative in culture, non-motile and pleomorphic : in subculture, the beaded appearance was readily demonstrated with Giesma stain. Colonies were round, minute and clear, resembling those of streptococci.

The organism failed to liquefy gelatin and to ferment glucose, lactose, mannite, saccharose, maltose and salicin. Blood or serum supplements were required to produce growth in carbohydrate medium. Indole was formed. Attempts to prepare agglutinable suspension were not successful. The spirochaete could not be cultivated.

Application of the discharge from an active sore did not produce lesions in rabbits or guineapigs either directly on the scarified skin or by intradermal inoculation : these methods did, however, produce typical ulcers, with predominating fusiforms, in human volunteers. It is added that in these cases the pus also showed the presence of Gram-positive cocci and (in one case) *Proteus*. Intradermal and subcutaneous injection of a young culture of the fusiform organism produced no lesion in a recovered case of naga sore. A killed suspension failed to elicit an allergic reaction in an active case either by intradermal or intraocular inoculation. A small vesicle, which retrogressed without resulting in a sore, was produced in 24–48 hours in three healthy volunteers after intradermal inoculation of a thick suspension of a culture of the fusiform organism, with or without a filtrate from a discharging sore : the filtrate alone did not produce any reaction.

An epidemiological survey was made of ten tea-estates in the Dibrugarh area of Upper Assam. Seventy-five persons gave a history of having had the sore in 1945 : a few still had unhealed ulcers. Forty-one were females [an unusual

preponderance, related perhaps to occupation]. All but six were engaged in outdoor horticultural work. The largest number were between the ages of 10 to 30 years : there were none below the age of 10, but six were over 50. In one-third of the cases, the ulcers were multiple, and all were on the lower extremities. Thirty-nine persons had a known history of trauma at the site of the lesion (27 cuts, 10 leech-bites, 2 wasp-stings). In the others, itching vesicles and papules were said to have appeared spontaneously. There was no evidence to incriminate any insect vector.

While cases continued during the rainy season in some estates, others with heavy rainfall escaped. Two contiguous gardens had different histories—several cases in one and none in the other. One estate had sporadic cases in 1944, but an almost epidemic form of the disease developed in 1945. Newcomers, such as labour recruits, were not more susceptible than older residents.

It is considered that diet plays little part in the aetiology of the disease, which varied within wide extremes of incidence or complete absence over several years despite a diet generally deficient in essential protein and vitamins. It is regarded as of little doubt that the widespread naga sore infection, which occurred over the greater part of Northern Assam in 1942–43 could be traced to the return to their homes of repatriated labourers from infected military camps.

[Although the series of ulcers studied is not large and no striking new information is added to the literature of this elusive disease, the method of approach and the range of investigations carried out at the Institute are to be commended and would well repay repetition in other areas.]

H. J. O'D. Burke-Gaffney

MATHIEU, M. Aluminium et ulcère phagédénique. [**Aluminium and Tropical Ulcer.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1947, v. 4, No. 3, 195–202.

This article is based on work done in Dahomey, West Africa, and the author comments on the many different methods of treatment which have been advocated. Treatment with aluminium was first used by a naval surgeon, Brette, in 1939, and, although up to the present the precise mode of action of this metal is a matter of controversy, the results appear to have been very effective. As the author remarks, tropical ulcer is a "veritable plague" in Africa, and by reason of its frequency and chronicity fills up the hospitals and dispensaries.

Eight cases are described in detail, all being typical instances of clinical tropical ulcer. There is no record of any bacteriological or histological examinations having been made.

Although aluminium appears to have a curative effect on the phagedaenic process, its chief use is in the period of cicatrization which is often so prolonged. Among the local inhabitants, the lesion is usually already far advanced and of considerable extent when first seen.

Methods of Treatment.

1. Powdered aluminium. The ulcer is first carefully cleansed with ether, aluminium powder then thickly sprinkled on, and an ordinary dressing applied. The powder must be reapplied in not more than three days.

2. Aluminium in the form of a plaque, 1/10 to 2/10 mm. thick. This is about the thickness of a piece of notepaper.

The plaque must be moulded to the general contour of the ulcer, and overlap the lesion so as to avoid injury to its edges. It is applied after cleansing with ether, either directly or after powdering with aluminium. Two holes are drilled into the overlapping part, through which pass a fixation tape. It is essential to leave the plaque *in situ* for several days, and this can be used several times ; it is sufficient to clean it carefully with ether before each re-application.

Aluminium powder seems to give the better results on account of the closer contact between the metal and the lesion.

Systematically used, this treatment has always given good results whatever the condition of the ulcer, cure being assured in a period of 15 to 35 days. From the first application, suppuration diminishes, the surface of the ulcer cleans, fills up, and takes on a healthy red appearance. Soon epithelium appears at the periphery and filling in and cicatrization progress rapidly from the periphery to the centre.

The advantages claimed are :—

1. Simplicity, cleanliness, and rapidity of action.
2. Economy in the use of dressings.
3. Complete tolerance in all cases.

[An interesting paper. This form of treatment would appear to be worth an extensive trial.] *C. F. Shelton*

MISCELLANEOUS DISEASES

ORDMAN, B. **A Review of the Incidence of Hypertension in the Non-European Races. Survey of Blood Pressures in the South African Bantu.** *Clin. Proc.* Cape Town. 1948, June, v. 7, No. 6, 183–210. [32 refs.]

Most of this article consists of a review of the literature on the incidence of hypertension in non-European races. RODDIS and COOPER (*J. Amer. Med. Ass.* 1926, v. 87, 2053), examining a number of European officers stationed in the tropics and on their return to cooler climates, concluded that :—

i. Blood pressure is modified by climate.

ii. The indigenous inhabitant of the tropics has a blood pressure lower than that of the temperate zone standard.

iii. In the tropics the systolic pressure of the northern white men averaged 10–15 mm. below the standard of temperate zones, this being due to a lower vasomotor tone and a general slowing of physiological activity.

A study of 774 healthy male Cantonese students by CADBURY (this *Bulletin*, 1924, v. 21, 417) showed that the systolic pressure averaged 20 to 30 mm. and the diastolic 10 to 20 mm. less than in European and American youths of corresponding age, weight, and height. Hypertension was very rare, either with or without nephritis, although Bright's disease was common. Among other reasons for this, the use of opium is given as an explanation. The work of other observers bears this out as regards the blood pressure of the local Chinese. DIEUAIDE (*Bull. Johns Hopkins Hosp.*, 1940, v. 66, 408), in 213 cases of essential hypertension, found obesity in 40 per cent.

Blood pressure studies by CONCEPCION and BULATAO [this *Bulletin*, 1917, v. 9, 260] in 697 male and 218 female Filipinos between the ages of 15 and 98 years showed average pressures of 115/79 mm. for males and 117/83 for females. In 65 opium addicts the blood pressure was lower than the average among non-addicts. A comparison by CHAMBERLAIN (*Philippine J. Sci., B. Med. Sci.*, 1911, v. 6, 467) of the blood pressures of 386 Filipinos between the ages of 15 and 40 years with those of American soldiers of similar ages stationed in the tropics showed no essential difference between the two groups.

In 500 male Bengalis between 20 and 25 years, MCCAY (*Lancet*, 1907, June 1, 1483) found the average systolic pressure to be 90 to 105 mm.

ISMAIL (*Lancet*, 1928, Aug. 11, 275) in a study of over 3,000 Egyptian patients in private practice concluded that :—

i. Chronic primary hyperpiesia in the absence of chronic renal changes was common, and formed at least 10 per cent. of all cases in private clinics.

ii. The disease was specially limited to the decades 35 to 55, and was rare under 30.

iii. About 10 per cent. of cases were females.

Nye (*Med. J. Australia*, 1937, Dec. 4, 1000) examined all available old people among Australian aboriginals, most of whom were grand or great-grand or great-great-grandparents, and found an entire absence of hypertension. It is pointed out that these people live in a state of great simplicity, *i.e.* they do not suffer from the strain of modern civilized life. Gross oral sepsis and cervical adenitis were present, they were heavy smokers and chewers of strong tobacco, and were almost entirely carnivorous. They hunted for their food and gorged only when hungry, often fasting for several days when food was scarce. The question of alcohol is not mentioned.

This observer concluded that age *per se* did not cause hypertension, and that " arteriosclerosis and hypertension may be the price civilisation pays for modern amenities in satiated appetites, sartorial perfection and vitiated atmosphere, and for our successes in a life of stress and strain."

Hypertension in the American Negro has received much attention, and the author quotes from ten papers on this subject. All the writers quoted agree that the incidence is much higher among the negro than the white population, being roughly from two to three times as common. One worker found that the incidence was 6·2 times as high in the age group 30 to 39 years, despite the fact that two hypotensive influences (malnutrition and tuberculosis) were common. The African, when transplanted to modern conditions of civilization, appears less able to adapt himself than his white neighbour.

Investigations by Donnison [this *Bulletin*, 1930, v. 27, 162] of the blood pressure in 1,000 healthy male Africans, aged 15 to 70 years, living at an altitude of 5,700 feet in the South Kavirondo District of Kenya, showed that up to the fourth decade the average readings were similar to those of Europeans, but that there was a tendency to lower readings in later life. Chronic septic infections were common, meat was frequently eaten, but there was an absence of " high pressure " existence.

Vint (*East African Med. J.*, 1937, v. 13, 332) who studied 1,000 consecutive autopsies in Nairobi, states that " True nephrosis as represented by the arteriosclerotic kidney is rare in Kenya. The writer has not seen a case of essential hypertension nor do medical records of the Colony show evidence of its occurrence."

This condition is, apparently, also rare in Uganda.

Jex-Blake (*ibid*, 1934, v. 10, 286) agrees with Vint, but the author thinks that their conclusions from autopsy studies are questionable.

Becker (*M. D. Thesis, Univ. Witwatersrand*, 1943; this *Bulletin*, 1946, v. 43, 1076), from an analysis of autopsies performed in Johannesburg between 1924 and 1938 concluded that hypertensive heart disease was the most common form of cardio-vascular disease amongst the Bantu and coloured races of South Africa as judged from post-mortem statistics, the condition being found in 247 instances in 3,000 routine autopsies.

Original work is presented by the present author on 1,522 apparently healthy male and female Bantus in South Africa.

Blood pressure readings were taken with a mercury manometer (Baumanometer) with the patient sitting, the effects of excitement and emotion being ignored. The systolic pressure was taken on the appearance of the first sound after deflation of the cuff and the diastolic on disappearance of all sound, readings being taken in the right arm. The following groups were examined:—

1. Mine workers returning from an underground shift at a gold mine at Germiston, Transvaal.

2. Mine workers and labour recruits being examined in Johannesburg.

3. Women receiving antenatal examination in Johannesburg.
4. Rural Africans in the Mafeking District (from three localities).
5. Groups of urban and rural Africans in Natal and Zululand, from eight different districts.

A diastolic pressure of over 90 mm. was taken to mean that the subject was either a hypertensive or a hyperreactor, and a systolic pressure of over 150 with a diastolic of 90 mm. or less was the criterion of systolic hypertension. No attempt was made to eliminate the factor of emotion or to obtain a modified basal reading at rest. The author considers that a hyperresponse to the excitement of examination is a valuable early sign of the hypertensive process. [Some would consider these figures on the low side.]

Of the total number examined the results were as follows: Of 708 males, 152 showed a diastolic B.P. over 90, and 42 a systolic B.P. over 150 and a diastolic of 90 or under. The corresponding figures for 814 females were 174 and 42. The incidence of a diastolic B.P. of over 90 rose with age, but lessened after 70 in males. No racial or tribal correlation was found between those with raised diastolic pressures and the normals in any of the groups. In the case of mine workers, there was no relation between blood pressure levels and periods of work underground. There was an association between hypertension and overweight.

[The literature on this subject is very extensively reviewed. As the African becomes more and more highly educated and more under the stresses and strains of modern life, it will be interesting to see in a generation or two how his blood pressure reacts.] *C. F. Shelton*

Tyndel, M. Ueber Lathyrismus. [**On Lathyrism.**] *Wien. klin. Woch.* 1948, Oct. 8, v. 60, No. 40, 656.

In the same epidemic at Vapniarka as that described by Ortner [this *Bulletin*, 1948, v. 45, 735] the author saw 9 cases in men of 16 to 30 years of age who began to show symptoms 2–3 months after starting on a diet consisting very largely of *Lathyrus sativus*. Two were mild cases, the others severe. When seen 1½ years after the onset, there had been some degree of improvement, but only the two who had been lightly affected could walk without the aid of a stick. All sorts of treatment had been tried: vitamin B by mouth and parenterally, pyretotherapy, passive movements, massage and electrical treatment, baths, liver injections, blood transfusions, nicotinic acid, nicotinamide, arsenicals such as sodium cacodylate and solusalvarsan. It is not possible to say to which, if any, of these the improvement was to be attributed, but the author thought that the passive movements and the baths and perhaps the blood transfusions all played a part. After two years the gait improved, but the chief symptoms remained unchanged. As regards causation, apart from the toxic element of *Lathyrus*, the general dietetic deficiency and the avitaminosis take a share. Vitamins C and D are present in small amount only in *Lathyrus*; aneurin is thermolabile and the prolonged cooking needed to make the *Lathyrus* fit for eating destroys the vitamin B entirely. *H. Harold Scott*

Davies, J. N. P. **Pathology of Central African Natives. Mulago Hospital Post Mortem Studies.—VIII.** *East African Med. J.* 1948, Aug., v. 25, No. 8, 322–6.

Gutner, L. B. & Fisher, M. W. **Chronic Melioidosis. Discussion, Case Report, and Special Studies.** *Ann. Intern. Med.* 1948, June, v. 28, No. 6, 1157–69, 6 figs. [16 refs.]

This is a detailed report of a case of chronic melioidosis in an American soldier, contracted probably in the Philippines. The liver, spleen, lungs and

glands were affected and *Pf. whitmori* was isolated from the numerous abscesses which were incised. For some time a diagnosis of infectious mononucleosis was considered, owing to the occurrence of a positive Paul-Bunnell reaction in high dilutions of the patient's serum. The differential diagnosis is discussed. The infecting organism was resistant *in vitro* to streptomycin, penicillin, sulphadiazine and urea, and to combinations of these drugs, in higher concentrations than could be achieved in the blood. This is believed to be only the second case of melioidosis diagnosed in the Western hemisphere.

J. C. Cruickshank

Arguelles Casals, D. Aftosis generalizada de Touraine (sindrome de Behcet). Primer caso Cubano. [**Behcet's Syndrome—Generalized Aphthosis of Touraine. First Case described in Cuba.**] *Rev. Sifilografia, Leprologia y Dermatologia.* Marianao, Cuba. 1948, Jan., v. 5, No. 1, 228–34. [14 refs.]

Characteristic symptoms of Behcet's syndrome are : aphthae of mouth and genitalia ; ocular lesions such as conjunctivitis, keratitis, retinitis, iritis, phlyctenules, hypopyon : cutaneous lesions—nodular, acneiform, pustular eruptions ; arthralgia and arthritis ; systemic disturbances such as fever and chills in repeated attacks. In some cases the cutaneous and systemic manifestations predominate, in others the mucosal. The cause is not known, but is probably a virus ; treatment is unsatisfactory.

The author describes the case of a Cuban woman, 38 years of age, with cutaneous lesions, nodular, red in colour, with undefined edges, in both legs, and oedema of the right ankle ; painful aphthae of the buccal mucosa and the border of the tongue ; later, similar lesions appeared on the internal aspect of the right labium majus. She had had several attacks during the year, accompanied by severe general pains, headache, fever and giddiness, and lasting 4–7 days as a rule, but sometimes as long as 3 weeks. The Frei and Mantoux tests were strongly positive, Kahn and Meinicke negative. The positive Frei reaction brought up for consideration a diagnosis of lympho-granuloma inguinale, but the usual treatment of this was unavailing and the final diagnosis was Behcet's syndrome, in spite of the absence of ocular symptoms. [Touraine is the name of the author who described this condition in 1941 (*Bull. Soc. française Dermat. et Syph*, 1941, v. 48, 61) and has nothing to do with the French Province of Touraine. See also this *Bulletin*, 1946, v. 43, 379, 1074.]

H. Harold Scott

Sekban, S. M. Deri Köstebeği hastaliği. [**Creeping Disease.**] *Türk Tip Cemiyeti Mecmuasi.* 1947, Sept., v. 13, No. 9. [In Turkish 398–9. English summary 57.]

The first case seen by the author, a dermatologist, in 44 years. He believes that the extreme rarity of records in Turkey is due to ignorance of the disease. The aetiology is not mentioned in this summary.

H. J. O'D. Burke-Gaffney

Calero, C. **Cutaneous Myiasis in Panama.** *J. Parasitology.* 1948, Aug., v. 34, No. 4, 343–4.

" The author reports a new case of cutaneous myiasis due to *S. haemorrhoidalis* (Fall.) which is reported for the first time from the Isthmus of Panama.

" A first report is made also, but with reservation, of cutaneous myiasis due to *C. hominivorax* (Coq.). Our reservation is due to the fact that for Panama there has been no comparative study since 1933 of the larvae originally reported as *C. macellaria* whereas numerous cases of cutaneous myiasis elsewhere reported before 1933 as due to these larvae proved later to be due to *C. hominivorax*."

PROTOZOOLOGY: GENERAL

MACDONALD, Etta M. & TATUM, A. L. **The Differentiation of Species of Trichomonads by Immunological Methods.** *J. Immunology.* 1948, July, v. 59, No. 3, 309–17. [18 refs.]

The authors have studied the possibility of differentiating three species of the genus *Trichomonas* by serological techniques with the special object of demonstrating the identity or otherwise of *T. hominis* and *T. vaginalis*. The third species used in the experiments for comparison was *T. foetus* of cows.

The serological techniques employed in the experiments were agglutination and agglomeration. The latter term refers to aggregation of motile flagellates with the posterior extremities towards the centre and the flagella of the anterior extremities actively motile at the periphery.

In preparing the immune sera, bacteria-free cultures of trichomonads were used as antigen and rabbits were immunized by intravenous inoculation, the sera being subsequently titrated by a micro-agglutination method. In some of the tests, absorption of antibodies in the sera by one or other of the antigens used was resorted to as a preliminary to cross titration experiments both in agglutination and agglomeration.

The results of the various experiments performed may be summarized as follows:—

1. Specific antisera prepared against the three species of *Trichomonas* under experiment, produced specific agglutination and agglomeration of these organisms.
2. Cross-agglutination and cross-agglomeration tests between *T. hominis* and *T. vaginalis* gave identical results within experimental error, but the results were significantly different in the case of *T. foetus*.
3. Absorption of *T. hominis* antisera by *T. vaginalis* removes the antibody for *T. hominis* and *vice versa*.
4. Absorption of *T. hominis* and *T. vaginalis* antisera by *T. foetus* removes the same amount of antibodies in each case.
5. The results of the various experiments indicate that *T. hominis* and *T. vaginalis* have identical antigenic structure.

H. E. Shortt

CROSS, Joy B. & ANIGSTEIN, L. **Chemotherapeutic Study of Experimental Toxoplasmosis—Preliminary Report.** *Texas Reports on Biol. & Med.* 1948, v. 6, No. 2, 260–65. [13 refs.]

This is an investigation into the treatment of experimental toxoplasmosis in mice by six drugs, used either alone or in combinations of two. The drugs tested were streptomycin, PABA, theophylline, toluidine blue, Sulfamylon and Aralen [Chloroquine diphosphate]. The numbers of mice employed in the experiments were small and the results of treatment showed no significant differences when compared with the results in untreated controls.

H. E. Shortt

ENTOMOLOGY AND INSECTICIDES: GENERAL

REYES, R. V. Artropodos de interes medico veterinario comprobados en Colombia. [**Arthropods of Medical and Veterinary Interest in Colombia.**] *Rev. Grancolombiana de Zootecnia, Hig. y Med. Vet.* 1947, Oct.–Dec., v. 1, Nos. 10–11–12, 698–721. [Bibliography.]

A table of 20 pages.

GÓMEZ, L. Revisión critica de los casos de oftalmomiasis españolas. [**A Critical Revision of the Cases of Ocular Myiasis in Spain.**] *Rev. Ibér. Parasit.* 1946, Jan.–Apr., v. 6, Nos. 1/2, 51–73, 2 pls. [30 refs.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1948, July, v. 36, Pt. 7, 119.]

In view of a case of ocular myiasis due to *Oestrus ovis*, L., in man in Granada in 1945, the author gives a list of about a dozen such cases that have been recorded in Spain since 1918. The identity of the larvae concerned is not certain in every one, but *O. ovis* appears to be the fly most frequently responsible, though it has sometimes been misidentified ; only one case was certainly due to *Rhinoestrus purpureus*, Brauer. The first-instar larvae of these two flies, which have sometimes been confused, are described, that of *R. purpureus* from the work of Portchinsky, and characters are given distinguishing them. The larvae of *O. ovis* observed in Granada and those described by Coulon & Dinulescu from Corsica are considered to represent different varieties, which are distinguished by the form of the spiracles as vars. *granatae* and *corsicae*, n.

RIDDELL, W. A., REMPEL, J. G. & MCNELLY, Elspeth. **The Specificity of the Precipitin Reaction, as used in the Study of Mosquito Feeding Habits.** *Canadian J. Res.* Sect. E. Med. Sci. 1947, Dec., v. 25, No. 6, 210–15, 1 pl.

The authors have investigated the reliability of the precipitin test when used with the stomach contents of mosquitoes which had been given the opportunity to feed on one, two or three animals. The mosquito used was *Aëdes aegypti* and the animals were man, rabbit and guineapig. The feedings were classified as negative ; single (on any one of the three animals) ; double (on any two) and triple (when fed on all three). With double and triple feeds, the order of the feedings and the time interval between meals were varied. The following table summarizes the feedings and reactions :—

Feeding	No. of specimens	Total individual feedings	Reactions			Total Errors
			Correct	Missed	Extra	
Unfed ...	90*	90 [unfed]	90	—	—	0
Single ...	307	307	287	13	7	20
Double ...	341	682	652	26	4	30
Triple ...	6	18	15	3	—	3
Totals ...	—	1,097	1,044	42	11	53

* This includes 79 unfed *Culex tarsalis* reared from larvae. They gave negative results to human, equine, bovine and avian sera.

These figures indicate a high degree of specificity (95·17 per cent.), the total errors being only 4·83 per cent. ; the false positives amount to only about 1 per cent. If the negative feedings are excluded, the value of 94·7 per cent. sensitivity for positive reactions is obtained. The figures also disclose that multiple reactions signify multiple feedings, since of double feedings 92·4 per cent. were correct. A point of importance in relation to field work is the fact, that of the 654 mosquitoes known to have fed on one or more of the hosts, 162 specimens showed no distention of the abdomen when killed ; yet 91·2 per cent. of the feedings were accurately determined by the precipitin test.

H. S. Leeson

YOUNG, D. A., Jr. **Notes on a** *Mansonia perturbans* **Problem at Edgewood Arsenal, Maryland.** *Mosquito News.* 1948, June, v. 8, No. 2, 57–60, 1 fig.

TEIXEIRA, A. W. G. A propósito da criação experimental de *Phlebotomus*. [**Experimental Rearing of** *Phlebotomus*.] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 107–48. [25 refs.] English summary.

The paper discusses studies in the field and the laboratory on Phlebotomus in Portugal. The species captured were : *P. perniciosus, sergenti, minutus* and *ariasi*, with a massive predominance of the former. In the neighbourhood of Lisbon the commonest species is *P. perniciosus*, but *P. sergenti* was found breeding in one limited area. Specimens of *minutus* and *ariasi* were taken but there is no reference in the paper to *P. papatasi*. Most of the biological notes refer, it seems, to *P. perniciosus*. The adults were first seen in the middle of April, became most abundant or most noticeable in August or September and disappeared in the middle of November. In the laboratory, eggs were deposited from early June to mid-November. The paper contains a number of notes on the proportion of females which had recently fed, the number of eggs laid and other matters. It includes a résumé of the work of other authors on methods of obtaining a culture of *Phlebotomus*. *P. A. Buxton*

ABONNENC, E. & CHASSIGNET, R. Phlébotomes de la Guyane française (XXIII). Description d'une espèce nouvelle : *Phlebotomus flochi*. [*Phlebotomus* **of French Guiana (XXIII). A New Species of** *Phlebotomus* **from French Guiana :** *Phlebotomus flochi*.] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 167.* 1948, Jan., 4 pp., 9 figs.

FLOCH, H. & CHASSIGNET, R. Phlébotomes de la Guyane française (XXIV). Description de deux femelles nouvelles. [*Phlebotomus* **of French Guiana (XXIV). Two New Females.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 170.* 1948, Mar., 6 pp., 2 figs.

FLOCH, H. & ABONNENC, E. Sur une variété de *Phlebotomus roubaudi* Newstead, 1913. *P. roubaudi* var. *fourtoni* nov. var. [*Phlebotomus roubaudi* **var. fourtoni, a Variety of** *P. roubaudi* **Newstead 1913.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 169.* 1948, Mar., 4 pp., 10 figs.

FLOCH, H. & ABONNENC, E. Phlébotomes du Vénézuela. Sur la femelle de *P. cayennensis* Floch Abonnenc, 1941. [*Phlebotomus* **of Venezuela. The Female of** *P. cayennensis*, **Floch Abonnenc, 1941.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 166.* 1948, Jan., 3 pp., 6 figs.

LEES, A. D. & BEAMENT, J. W. L. **An Egg-waxing Organ in Ticks.** *Quart. J. Microscop. Sci.* 1948, Sept., v. 89, Pt. 3, 291–332, 13 text figs. & 15 figs. on pl. [26 refs.]

GINSBURG, J. M. **A Rapid Method for preparing DDT in the Laboratory.** *Science.* 1948, Sept. 24, 339–40.

WAIN, R. L. & MARTIN, A. E. **Determination of p,p'-DDT in Commercial Samples.** *Analyst.* 1948, Sept., v. 73, No. 870, 479–83, 3 figs. [11 refs.]

DE JONG, J. C. M. & CSEH FIRTOS, S. Ervaringen met DDT. [**Experiences with DDT.**] *Nederl. Tijdschr. v. Geneesk.* 1948, Oct. 23, v. 92 (iv), No. 43, 3404–8, 2 figs. on 1 pl. English summary.

SMITH, C. N. & BURNETT, D., Jr. **Laboratory Evaluation of Repellents and Toxicants as Clothing Treatments for Personal Protection from Fleas and Ticks.** *Amer. J. Trop. Med.* 1948, July, v. 28, No. 4, 599–607.

This paper describes preliminary sorting tests with a large number of compounds. Details should be sought in the original paper.

H. J. O'D. Burke-Gaffney

LABORATORY PROCEDURES

BLACK, R. H. **Haemoglobin Stains adapted for use with Thin Blood Films.** *Ann. Trop. Med. & Parasit.* 1948, Sept., v. 42, No. 2, 236–7.

The author has previously discussed the specificity of staining methods for the identification of haemoglobin in tissue sections [this *Bulletin*, 1948, v. 45, 873]. For use in the case of thin blood films these methods require certain modifications. In a previous paper, the author described such a method with the use of cyanol [*ibid*, 1948, v. 45, 25]. He now briefly summarizes that method and adds two others, namely (1) alizarin red S and phosphomolybdic acid, which method has been used to study the acquisition of haemoglobin in the maturation of red cells of ducklings infected with *Plasmodium cathemerium* and (2) reduced fuchsin and methyl green, which has been used to observe staining reactions of avian malaria parasites and the changes in haemoglobin content of chick erythrocytes during maturation.

For the first method, blood films fixed with methyl alcohol are stained for 15 minutes with Ehrlich's acid haematoxylin. This is washed off with water and the slides are placed for 1½ minutes in 10 per cent. aqueous phosphomolybdic acid. Washing is repeated and followed by staining for 18 hours with a mixture of 50 cc. of saturated aqueous alizarin red S and 10 cc. of 10 per cent. aqueous phosphomolybdic acid. The slide is washed again and dried. Haemoglobin in the red cells stains bright yellow, and nuclei—as in avian blood—are well defined and dark purple.

The second method is stated to give a better contrast between nuclei and cytoplasm of avian erythrocytes than any yet studied. Haemoglobin causes the reduced leuco-form of fuchsin to regain its colour and the haemoglobin of the red cells itself becomes stained with it.

The stock solution consists of a mixture of 1·5 gm. acid fuchsin, 5 gm. powdered zinc, 2 cc. glacial acetic acid and 100 cc. distilled water. The mixture is boiled and soon becomes decolorized: on cooling, another 2 cc. glacial acetic acid is added. The working solution is made by filtering off 10 cc. and adding 1 cc. of commercial hydrogen peroxide to it.

Methyl alcohol-fixed dried thin blood films are covered with the working solution, which is left until colour intensity is complete—about 3 minutes. The stain is tipped off and the film is counterstained with 0·5 per cent. aqueous methyl green for 1 minute: after a brief wash in water, the slide is blotted dry.

Haemoglobin in normal mature red cells stains with fuchsin and nuclei of avian red cells stain green.

In chick blood infected with malaria parasites such as *P. gallinaceum*, the latter appear as rounded pale green areas in the cytoplasm: the pigment is easily seen. In heavy infections, a series of colour changes is seen depending on the degree of maturation and acquisition of haemoglobin. The cytoplasm of erythroblasts stains green: some show mitotic figures. With further maturation, the green staining is lost and more fuchsin appears in the cytoplasm as the nucleus becomes smaller, more oval and more compact. It is only in those cells in which the cytoplasm takes the fuchsin stain that the *P. gallinaceum* are found.

H. J. O'D. Burke-Gaffney

Wolff, J. W. Een eenvoudige snelle kleuring voor bloedonderzoek op malariaparasieten. [**A Simple Rapid Stain for Malaria Parasites in Blood.**] *Nederl. Tijdschr. v. Geneesk.* 1948, Sept. 11, v. 92 (iii), No. 37, 2834–7. English summary (4 lines).

The method, which is a modification of Boyé's method [this *Bulletin*, 1940, v. 37, 737] is carried out as follows. Films and thick drops are prepared and fixed with methyl alcohol in the usual way, and stained with Stévenel's blue for 15 seconds. The stain is then rinsed away with tap water and 1/1,000 eosin solution is applied for 15 seconds. After rinsing with tap water the staining with Stévenel's blue and subsequent rinsing are repeated, and the slides are then dried. *D. J. Bauer*

Rosenfeld, G. Corante pancromico para hematologia e citologia clinica. Nova combinação dos componentes do May-Grünwald e do Giemsa num só corante de emprego rapido. [**Panchromic Stain for Hematology and Clinical Cytology. A New Combination of the May-Grünwald and Giemsa Components in a Stain of Rapid Application.**] *Mem. Inst. Butantan.* 1947, v. 20, 329–34. English summary (8 lines).

The author claims that this stain is easy to prepare, simple to use, rapid in action, gives more delicate nuclear and protoplasmic delineation than the May-Grünwald, Giemsa, or Pappenheim stains, and, lastly, retains its properties unchanged "for many years". Its constituents are as follows: Azur A 0·342 gm., yellow eosin 0·342 gm., methylene blue 0·286 gm., eosinate of methylene blue 0·530 gm., methanol 1 litre. To a blood smear is added 0·5 ml., which fixes it in 1–2 minutes. Distilled water, boiled for 10 minutes and used within a week, is added in twice the amount of the stain and left for 5 minutes or a little longer. The slide is then washed in distilled water and dried with blotting-paper. The longer it remains wet the more it loses colour. *H. Harold Scott*

Rosenfeld, G. Metodo rapido de coloração de esfregaços de sangue. Noções praticas sobre corantes pancromicos e estudo de diversos fatores. [**Rapid Method for the Coloration of Blood Smears. Practical Notes on Panchromic Stains and Studies of various Factors.**] *Mem. Inst. Butantan.* 1947, v. 20, 315–28, 3 figs. English summary.

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

Colonial Office. **Colonial Research 1947–48. Reports of the Colonial Research Committee, Colonial Products Research Council, Colonial Social Science Research Council, Colonial Medical Research Committee, Committee for Colonial Agricultural, Animal Health and Forestry Research, Colonial Insecticides Committee, Colonial Economic Research Committee.** Cmd. 7493. 119 pp. 1948. London: H.M. Stationery Office. [2*s.*]

The principal interest of this Report to readers of the *Bulletin* lies in the third annual report of the Colonial Medical Research Committee and the first report of the Colonial Insecticides Committee.

The former occupies some twelve pages and is closely packed with information regarding research problems in being or contemplated, with brief accounts of the activities of the large number of workers engaged upon them. Much of the work referred to has already been noted in papers abstracted in the *Bulletin*.

The Report mentions the visits made by several medical experts to various parts of the Colonial Empire, especially Africa: and refers particularly to measures to be taken to implement recommendations made by the late Professor

McSwiney after his visit to East Africa in 1946. These include the proposed establishment of an East African Bureau of Medical Research, with headquarters at Nairobi, and of a Health Survey to be located initially in Sukumaland, at the southern end of Lake Victoria in Tanganyika Territory.

Reference is also made to the Virus Research Institutes in Uganda and Nigeria; the proposed handing over to the Colonial Office for a research laboratory of the existing laboratory in Freetown maintained by the Liverpool School of Tropical Medicine; research on hot climate physiology in Nigeria and general physiology in Uganda; and investigations of the bionomics of *Ornithodorus moubata* in relation to relapsing fever in East Africa.

Informative reviews are given of research work now in progress. These include the work on malaria control in Borneo, by Dr. J. McARTHUR, based on his findings of the rôle of *A. leucosphyrus* as a vector: entomological studies on anophelines in East Africa by Dr. Muirhead THOMSON, who had investigated *A. gambiae* and *A. melas* in West Africa and now reports interesting findings on salt-water breeding of *A. gambiae* in Dar es Salaam; work on malaria control in the Kenya Highlands; studies on Paludrine in Asia and Africa and the question of possible differences in susceptibility to this drug between Asiatic and African strains of the malaria parasite, the results in Africa having appeared to be less satisfactory than in India and Malaya; and a full description of proposals relating to nutrition studies. This includes references to the work of Drs. WATERLOW and WEBB on a "pellagragenic" substance in maize bran and on fat metabolism in the liver: field nutrition research in the Gambia where a station has been set up at Fajara and surveys are being made on clinical features, food consumption, crop production, general agriculture, social services and education. Nutrition research is also carried out in other parts of West and East Africa and in Mauritius, the West Indies and the Far East.

Special mention is made of the recommendations of the Nutrition Sub-Committee that a section of applied nutrition be formed, with the object of assisting Colonial Governments further in the efforts to improve the nutrition of their populations; and the detailed objects of such a section are set out.

Work on the control of schistosomiasis and of Miracil in its treatment, is discussed. The work of Drs. HAWKING and ROSS of the Medical Research Council Scientific Staff and of Dr. BLAIR of Southern Rhodesia is mentioned. The M.R.C. has established a team for research on schistosomiasis and its control in Egypt.

Research on filariasis continues and a team is being sent to Africa to study the chemotherapeutic potentialities of Hetrazan. The work will also be applied to *Loa* and *Onchocerca* infections.

The report presents a concise but comprehensive account of medical research projects in the Colonies; and this presentation under one cover provides striking evidence of the wide range of that work, the extent of which is not always either understood or appreciated.

The first Annual Report of the Colonial Insecticides Committee covers 10 pages and is divided into three parts. The first deals with the general organization and terms of reference of the Committee. Its function is primarily to initiate insecticide research, especially its application in field experiments: to examine schemes, problems and new scientific information relating to the subject and to advise and, where necessary, reinforce Colonial Governments or other appropriate bodies accordingly; and to co-ordinate agricultural, medical and veterinary interests in the use of insecticides. In the latter connexion, the necessity to consider the effect of insecticides on beneficial insects and the need for knowledge of the ecological problems involved were stressed.

Part II of the Report gives an informative account of the many-sided work of the Committee. It describes the several schemes initiated or sponsored by

the Committee and a number of the experiments referred to are described in considerable detail in part III. Most of the work reported has already been noted in this *Bulletin*. It includes the activities of the Research Unit in Uganda; the Colonial Insecticides Team which will shortly start work in Britain at Porton near Salisbury; the malaria eradication work in Mauritius and Cyprus: experiments completed or contemplated with aircraft dissemination of insecticides in East Africa, Zululand and Swaziland; the use of helicopters in hilly and other difficult country: defoliation experiments: disinfestation of stationary and airborne craft with non-inflammable and non-corrosive formulations of DDT and benzene hexachloride: experiments with smoke generators against tsetse flies: and various ecological and agricultural problems. Special notice is given to the Todd Insecticidal Fog Applicator, in which the fog is produced by passing the insecticide under pressure into a hot air blast. Work on the *Simulium* and onchocerciasis is described.

The need for work on insecticide research in Malaya and Nigeria was recognized, and while staff cannot be provided at present, the Committee is bearing the matter in mind and maintains co-operation with the field workers in an advisory capacity in the former country.

Liaison with overseas workers, with various other relevant committees and with other organizations is wide and valuable, and this is described at some length.

An appendix lists 13 publications of the Colonial Insecticides Research Unit. Only four of these were actually published: the remainder were circulated in mimeographed form [their eventual publication would be of very great value].

The comprehensive nature and range of work set out in this Report amply justify, if indeed justification were needed, the establishment of insecticides research as an important new and specific branch of disease control in man, animals and plants. *H. J. O'D. Burke-Gaffney*

MARTINIQUE. Rapport sur le fonctionnement technique de l'Institut Pasteur de la Martinique en 1946 [MONTESTRUC, E., Director.] [**Report of the Pasteur Institute of Martinique for the Year 1946.**] pp. 183+iii.

This Report is divided into five parts. The first gives a statistical analysis of the laboratory examinations for the year. General medical routine investigations amounted to some 40,000. There were nearly 20,000 serological and 8,000 cytological examinations. The second part of the report discusses at some length the various infections encountered. These include intestinal diseases, diphtheria, malaria, rickettsial diseases, leprosy, tuberculosis and venereal diseases. The incidence of malignant disease is also discussed and there is a detailed discussion of haematological findings. Various other routine investigations are also discussed.

The third part is concerned with research on the enteric diseases, anopheline mosquitoes of Martinique, general entomology, water bacteriology, rickettsial diseases and brucellosis. The fourth part gives an imposing statement of the large quantities of biological products provided and the fifth deals with staff and administrative matters. Papers by members of the staff, dealing with some of the subjects mentioned, are listed.

A valuable summary in English of the Report is presented at the end. Points of special interest include the following:—

Typhoid fever is the most important endemic disease in Martinique, both quantitatively and in its gravity. There were 369 cases in 1946 of which 360 were confirmed bacteriologically. Except for 2 paratyphoid A and 4 paratyphoid B infections, all of these were *Salm. typhi* infections. *Malaria* was found in the infected areas of the island (south and south-east) in 61 cases;

2 each were *P. vivax* and *P. malariae* infections and the remainder were *P. falciparum*. The principal anopheline was *A. aquasalis*, which is the local vector of malaria. *A. argyritarsis* is also found, but is of little importance as a vector. There were 18 cases of *murine typhus* identified either by *Proteus* or rickettsial agglutination : 13 were from Fort-de-France and 5 from inland areas. Fifty-three new cases of *leprosy* were discovered. Seventy-four *tumours* were found in 236 histopathological examinations, of which half were malignant. Of the *helminth* infections, *Trichuris* accounted for one-third and hookworms and roundworms for about one-quarter each of 7,750 examinations of stools. *S. mansoni* was present in 6 per cent. *E. histolytica* was only found on two occasions, but *Giardia* was present in 301 specimens. One new case of *Syngamus* infection was found, being the third recorded in Martinique.

The Report is well presented and contains an abundance of information regarding the prevailing pathological and other medical problems in Martinique.

H. J. O'D. Burke-Gaffney

East African Med. J. 1948, July, v. 25, No. 7, 273–80. **The Native Authority Dispensary System in Tanganyika Territory.** A Paper read at a Meeting of the British Medical Association of Tanganyika on the 20th February, 1948, by Dr. A. McKenzie, and Record of Subsequent Discussion [McNamara, H. E. ; Hill, J. F. R. ; Jackson, E. ; McKenzie, A. (in reply)].

The Native Authority Dispensary System was developed in Tanganyika Territory from 1926 onwards as a joint effort by the Medical Department and the Provincial Administration. It was an attempt to give some form of medical attention to the people in remote villages. The Medical Department undertook the training of the dressers, and also acted in an advisory capacity, but finance, discipline and organization were the responsibility of the Administration. Dispensaries were built from Native Authority funds, and the scheme became popular with the people. The dressers were trained to treat minor ailments, and encouraged to send more serious cases to hospital ; but by 1930, when there were 288 dressers, it became evident that some of them were attempting work beyond their powers. Increased inspection and more advanced training were instituted in some parts, but reorganization became necessary in view of the general inefficiency. The course of training was extended to 18 months in the Lake Province, where intensive instruction was possible, and to 3 years in other parts where no special teaching staff was available, and where the course consisted of 3 months' classroom work followed by 9 months' practical apprenticeship to an experienced dresser, repeated for the 3 years, or 18 months in hospital and 18 months as apprentice.

The Native Authorities in other provinces began to demand better qualifications in their staffs, and by 1939 it was necessary to review the situation once more. Then the training was concentrated in as few places as possible, and refresher courses were arranged. Nevertheless, the Medical Auxiliaries (as they were now called) did not give an efficient service, and there was a tendency for them to degenerate into dishonesty in their remote stations. This was the position at the end of the war, and McKenzie leaves it there. The question is whether to expand the service, as it has been expanded in the past, or to consolidate and improve the existing service without expansion for the present.

In the discussion following McKenzie's paper, Calwell made the point that the Medical Department should control the service and that the training of dressers should not be too academic. He agreed with McKenzie on a policy of consolidation. The policy of expansion was urged by Mr. Hill, Deputy Provincial Commissioner, who pointed out the need for treatment of people in the remote areas.

Charles Wilcocks

TRAPNELL, C. G., MARTIN, J. D., ALLAN, W. and other Members of the Department of Agriculture and the Forestry Branch with an Explanatory Memoir by C. G. TRAPNELL. **Vegetation-Soil Map of Northern Rhodesia.** 20 pp., 2 folding maps. 1947. Lusaka, Northern Rhodesia.

The work consists of two sheets of map of a scale of one to a million, which is about sixteen miles to the inch, together with an explanatory text. It should be studied in connexion with ecological surveys published by Trapnell for North-west Rhodesia in 1937 and North-east Rhodesia in 1943. The information given relates to distribution of plants (particularly trees and shrubs) and soils: in all about fifty types are distinguished. Some reference is also made to the present use of the different types of land. It is not proposed to review these documents. Attention is called to them because of their evident importance in relation to the ecology of tsetse: they are probably also important in relation to the distribution of small mammals, which is related to possible epidemiology of plague and other diseases. *P. A. Buxton*

STRODE, G. K., WHAYNE, T. F., WILLIAMS, L. L., Jr., SAPERO, J. J. & SNYDER, J. C. **Health Hints for the Tropics.** *Supplement to Trop. Med. News.* [1948.] 20 pp. [17 refs.] Bethesda 14, Md.; National Institute of Health.

Small publications giving hints on preservation of health, to intending travellers to hot countries, are often asked for, but not always easy to find. The authors have provided such a concise guide, and have been able to condense a remarkably large amount of information in the small compass of 20 pages. They give good advice on climate, water, food, insects and the diseases they carry, and immunization, and conclude with a section of miscellaneous hints on skin diseases, effects of heat, rest, alcohol, clothing, housing, snakes and dangerous fish.

It is a good and well written pamphlet; very short, of course, but full of good sense. *Charles Wilcocks*

PODACH, E. F. **Robert Koch.** 84 pp., 5 figs. & portrait. 1947. Berlin & Leipzig: Volk und Wissen Verlags GMBH. [1 Rm.]

In a book of pocket size ($6 \times 4 \times \frac{1}{2}$ inches) and 84 pages, the author tells the very interesting story of the professional life of Robert Koch and, largely by quotations from a paper by Professor F. K. Kleine ("Mit Robert Koch in Afrika und in der Heimat", *Ztschr. f. Hyg. u. Infektionskrankheiten*, 1943, v. 125, 265) enables the reader to form some idea of Koch's personality. His outstanding ability was first generally recognized when, in 1876, he demonstrated his experimental researches on anthrax to Ferdinand Cohn, the Professor of botany at Breslau University. From that time, Koch carried on research in bacteriology and protozoology almost to the time of his death, in 1910. This life-story of constant labour and brilliant discovery at home and abroad is well told in this little book; an index of the persons referred to in the text, a glossary of technical terms, and a short bibliography make a useful appendix to the narrative. *J. F. Corson*

ARRÁIZ, A. Historia natural de Venezuela. (Introducción a una Geopolítica Venezolana). [**Introduction to a Survey of Natural History in Venezuela.**] *Rev. Grancolombiana de Zootecnia, Hig. y Med. Vet.* 1947, Oct.–Dec., v. 1, Nos. 10–11–12, 794–821.

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